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INVESTIGATION AND EXAMINATION OF A BARK RECENTLY
INTRODUCED INTO THE DRUG MARKETS OF NEW YORK
AND PHILADELPHIA, AND OFFERED FOR SALE AS THE
GENUINE WINTER'S BARK.

By E. S. WAYNE, Cincinnati.

Upon a recent visit to the East, I was shown by Mr. Edward Parrish, of Philadelphia, a specimen of a bark which he informed me was offered for sale by one of the drug houses of that city as the genuine Winter's bark. My opinion was asked, at the same time, concerning it; whether it was Winter's bark or not; if not, was I acquainted with it, and what was the name and origin of it? From the appearance of the bark it was easy for any one acquainted with that of the genuine Winter's bark, to decide at once that it was not the same; but what it was, or its origin, we were unable to tell. Meeting afterwards with Prof. Wm. Procter, I questioned him concerning the same, and found that he was also unacquainted with it.

A few days after my interview with Mr. Edward Parrish, I again met my new acquaintance in the drug house of Mr. Geo. W. Lawrence, of New York. Upon recognizing it I inquired what it was, and was informed that it was Winter's bark. Feeling somewhat curious concerning it, I made a number of inquiries, with the hope of obtaining some clue to its origin; the only point I could, however, ascertain concerning it was, that it was imported from the west coast of South America. By permission, I selected about a pound of the bark, which I took home with me, with the intention of examining its proximate constituents,

and, with the aid of authorities, to ascertain its botanical origin, and have met with the following success:—

In the London Journal of Pharmacy, vol. iii, page 169, will be found an article, by Dr. Alexander Ure, upon the South American bark called the Malambo or Matias bark, a short extract of which will be found in the appendix to the U. S. Dispensatory, page 1349. Dr. Ure states in his paper, that Malambo or Matias bark is the product of a tree in Colombia, S. A., and that it was placed in his hands by Hugh Houston, Esq., which gentleman received it from Dr. Mackay, who communicated two papers respecting it to the British Association, and mentions having procured from it by distillation two oils, one lighter than water, of a specific gravity 0.949; the other denser, of a specific gravity 1.028. He further obtained a brown, bitter extractive substance. Dr. Mackay remarked, that it had been successfully used in intermittent fever, in convalescence from continued fever, in hemicrania, dyspepsia, and a variety of chronic ailments, where tonics and stimulants were indicated; and that as an adjunct to diuretic remedies, it had been found eminently useful.

Dr. Ure describes the Malambo or Matias bark to be three or four lines in thickness, brittle, though somewhat fibrous; emitting when fresh bruised an aromatic flavor, not unlike that of calamus; color of a brown hue, covered with an ash-colored tuberculous epiderm, and possessing a bitter pungent taste. With water it forms an agreeable bitter infusion; with alcohol, a powerful bitter tincture. Ether extracts from it volatile oil and resin. Heated along with hydrate of potash, free ammonia is disengaged, indicating the presence of an azotized principle. It is without astringency. It appears to coincide, as suggested to me by M. Guibourt, both in regard to physical and sensible properties, with Malambo, the Indian name for the bark of a tree which grows in New Granada, and which is held in high esteem among the natives as a febrifuge and stomachic.

Malambo bark was analysed by M. Cadet Gassicourt, about twenty-eight years ago (*Journ. de Pharmacie*, tom. ii, p. 172); subsequently by M. Vauquelin, who ascertained the presence of three distinct substances, namely: 1. An aromatic volatile oil. 2. A very bitter resin. 3. An extract soluble in water, which

yielded ammonia when heated with caustic potash. (*Annales de Chimie*, tom. xevi, p. 113.) It afforded no tannin, scarcely a trace of gallic acid and none of the alkalies of cinchona. It is stated, in the countries where the tree is indigenous, incisions are made in the bark, and there exudes an aromatic oil which sinks in water. Most authors believe it to be the produce of a species of drymis, but M. Bonpland regards it as a quassia. (*Merat. et de Lens. Dictionnaire de Mat. Med.*, tome iv. p. 199.) This, however, is improbable, since none of the quassia tribe yet discovered are possessed of aroma.

Dr. Ure further mentions in his paper, that he has used the Malambo bark with good effect. That it offers the useful combination of a tonic and aromatic; and seems to exercise its beneficial influence upon the principle laid down by Professor Schultz, with regard to other therapeutic agents of the same class; namely, in promoting an increased flow of bile, whereby digestion is perfected, and healthy blood formed. In scrofulous ophthalmia, after removing feculent accumulations from the bowels, I have known an infusion, made with two drachms of the bark to a pint of water, cause a speedy and complete removal of the inflammation and morbid sensibility of the eyes. The dose of the infusion just mentioned, is from one to two ounces, repeated twice or thrice in the course of the day. It may, in some instances, be advantageously conjoined with salts of iron or mercury, with both of which it is compatible. The addition of a little syrup of orange peel and compound tincture of cardamom, forms a draught by no means disagreeable.

In volume vi. of the same journal, page 255, will be found another paper upon the same bark, by W. Hamilton, M. B., in which he mentions that as far back as 1825, he received a portion of bark under the name of Malambo, from Mr. Edward Watts, Esq., British Consul at Carthage, accompanied by extracts from some of the Spanish writers on the natural history and productions of that province, detailing its medicinal properties, but without furnishing any clue to the localities in which it is found, or the botanical characters of the tree from which it is obtained; and mentions that he turned with some eagerness to Dr. Ure's paper, in the hope of meeting in it some information which he failed to procure from other sources, but was disap-

pointed in his expectations. Dr. Hamilton regrets his inability to throw more light upon this part of the subject (*i. e.* the botanical) than those who had preceded him; but, as connecting links in the history of a substance, which, although known in Europe for upwards of thirty years, still slumbers in mysterious obscurity, and is far from being appreciated to the extent of its merits, gives the following fragments of its local history: In a work on the natural productions of the province of Carthagera, by Don Jorge Lopez, the date of which he did not unfortunately possess, that writer states: A tree exists in the province of Carthagera, of the stature of cinchona, called the Malambo, whose bark, in my opinion, possesses qualities far superior to those of cinchona. It abounds in an aroma so durable and penetrating, that it is not impaired by lapse of time, and must, therefore, I imagine, consist of gummy particles of great value to man. It is a native of this province, and very abundant. I speak of its bark, and were the Faculty to employ it, cinchona would sink into disrepute. It is employed with known advantage in this country in the treatment of various complaints, especially in spasms, wounds, inflammations, and disorders of the stomach. It would, I think, be highly beneficial in cases of dropsy, and malignant fevers. Experience has proved its efficacy in asthma, rheumatism, dysentery, and menstrual obstructions, in my own practice. In fine, here, and in the country especially, it is a universal remedy, employed with the happiest effects in all the above named complaints."

From another rare and valuable Spanish work, in the possession of Mr. Watts, Dr. Hamilton obtained the following extracts:—

"The third is the Malambo, whose aromatic bark is a powerful anti-spasmodic, containing bitter febrifuge and astringent properties of great activity. It abounds in the province of Santa Martha, where it is employed in the cure of spasms, intermittents, calentures, and dysenteries; it occurs also in various parts of this province, (Carthagera.) The bark is exported to the Havanna, where it is exhibited in the treatment of spasms, (tetanus,) to which the negroes are very subject; and since the adoption of this remedy, hardly any deaths arise from the complaint. Here we make no use of it; and very lately (in 1810,

at Carthagena,) we have witnessed the death of a valuable young man from the neglect of exhibiting this remedy in sufficient time. It is a most important vegetable production, meriting the attention of government from the valuable properties it possesses, and the use made of it at Santa Martha. Both from the color and smell of the bark it would appear to belong to the genus *Cusparia*, or the cinchona of Angostura, which entered into the prescription of the late Dr. Mutés for the cure of dysentery; and we have no hesitation in saying that the bark of the Malambo may supply the place of that of the *cusparia*."

In volume ix. of the same journal, page 463, is an article by James Stark, M. D., upon copalchi bark. He mentions that in the course of some inquiries into the remedies used in Chili and Peru, that he received from one of his correspondents in Chili a bitter bark, under the name of Natri, which was stated to be much used by the medical practitioners and natives of Chili, in the treatment of intermittent and other fevers, and held in higher repute than even Peruvian bark itself. The bark and leaves sent me enabled me to ascertain that the Natri was the produce of a species of *Croton*, but from the want of the flowers and fruit, the particular species could not be determined. Also that in the course of a correspondence with a friend, he was informed that a quantity of the bark had been received by a house in London from San Blas, which appeared to be identical with the Natri. A small quantity of the bark had also been brought over by a gentleman from Santa Cruz, who states that it was there known under the name of Chinquique, and was always given to Indians in fever cases, and was considered by the medical practitioners there as superior in certain cases to cinchona bark itself.

Mr. Howard at once recognized this bark as the copalchi bark of Goebel, a valuable Mexican bitter, described by him as the product of the *Croton suberosum*. Dr. Stark says, that he is satisfied that this bark (Natri) is the bark known since 1825 in Europe, and described under the names of Copalchi bark and Quina blanca, the product of one tree, variously termed *Croton suberosum* by Humboldt, Bonpland, Kunth, &c., *Croton pseudo*, China by Schlechtendal and Nees von Esenbeck; and *Croton cascarilla* by Professor Don. Dr. Stark has made a number of

trials of this bark, and the administration of it at his hands has been very satisfactory. (See article.)

This bark was examined by Mercadieu in 1825, who found it contain no crystallizable alkaloid. Brandes, in the year following, who failed also to detect any crystallizable alkaloid, but recognized the bitter principle on which its active properties depend, a resin, concrete fatty oil, &c.

Mr. Howard made some trials to prepare the bitter principle in a pure state. The bark was exhausted by alcohol, the tincture evaporated to dryness, and the bitter principle removed from this extract by cold water, and upon the evaporation of the water the bitter principle was obtained in dark brown, almost black, lustrous but non-crystalline scales of an intensely bitter taste.

I shall now attempt to sum up what information I have gleaned that has any bearing upon the bark in question; and the query might be made, what has the Malambo bark described by Ure and Hamilton, and the Copalchi by Stark to do with it? My object is by the similarity of the medicinal value, their origin and proximate constituents to prove the identity of the Malambo with the Copalchi bark described by Stark and Pereira in his work upon *Materia Medica*, as Corky Copalchi, the product of *Croton suberosum*.

And, having done this, to show that the bark I have mentioned in the beginning is identical with the Malambo, consequently the Copalchi.

Now let us examine first, the statements concerning the medicinal value and uses of the Malambo and Copalchi barks, as mentioned by Drs. Ure, Hamilton and Stark; they are so similar that I think it is impossible to doubt their identity.

In Dr. Ure's paper, it is stated that the Malambo has been successfully used in intermittent fevers, in convalescence from continued fevers, and in a variety of chronic ailments where tonics and stimulants were indicated, and that in New Grenada it was held in high esteem by the natives as a febrifuge and stomachic.

Dr. Hamilton, in his paper upon the same, fully endorses the statement of Ure, and quotes from Spanish authority to the same effect, &c.

Dr. Stark says of the Copalchi bark, that the medicinal practitioners of Chili, in the treatment of intermittent and other fevers, esteem the bark more valuable than the cinchona, and that he had administered it himself, and found it to be useful in atony of the stomach and bowels, with weak and imperfect digestion and irregular action of the bowels; and, in such cases, found it superior to the usual bitters, as gentian, quassia, Peruvian bark, &c.

Next, as to the sources of the bark and its botanical origin, Dr. Ure states that it is obtained from a tree in New Granada. Dr. Hamilton quotes from Spanish authors who state, that it is found in the province of Carthagena, and is of common occurrence, and may, no doubt, be found throughout the whole littoral chain, which stretches from the Punta Paria in the East to the Gulf of Maracaibo, and thence westward through the provinces of Santa Martha and Carthagena to the Gulf of Darien; and, as the flora of Trinidad is but an extension of that continent, it is by no means improbable that it is a denizen of those forests. The Copalchi is common in Chili and Peru, and in the drug shops of Jalapa, and Pereira mentions a shipment of this bark from Peru to Hamburg through Liverpool in 1827, part of which was shipped at Pataya and Guyaquil. Of the botanical description of these barks I can glean no positive information. Dr. Ure says, that authors believe the Malambo to be a species of drymis, but that M. Bonpland regards it as a quassia, and remarks that the last is impossible, as none of the quassia tribe yet discovered are possessed of any aroma. In Stark's paper, it is, upon Spanish authority, said to resemble, both from color and smell, the genus Cusparia, or the cinchona of Angostura, which entered into the composition of the prescription of the late Dr. Mutés for the cure of dysentery.

Although he has not been able to lay his hands upon the description of Goebel, Dr. Stark says he is satisfied that the Copalchi is the same bark known in Europe since 1825, and described under the names of Copalchi and Quinia blanca, the product of one tree, known as the *Croton suberosum* by Humboldt, Bonpland, Kunth, &c., *Croton pseudo-china* by Schlechtendal, &c., and *Croton cascarilla* by Prof. Don. The medicinal properties attributed to these barks in South America, its general

use, its wide geographical range, are strong points as to their identity.

We have, in the papers mentioned, but one physical description of the bark given, that of Dr. Ure. He states that it is three to four lines thick, brittle, though somewhat fibrous; emitting, when fresh bruised, an aromatic flavor, not unlike that of calamus. It is of brown hue, covered with an ash-colored, tuberculous epiderm; it possesses a bitter pungent taste. This description is similar to that given by Pereira for the Corky Copalchi, and in every particular answers the description of the bark I have in my possession, obtained in New York.

Now let us examine the chemical examination of these barks and the products obtained.

Malambo bark, analysed by Gassicourt, yielded: 1st. An aromatic oil (volatile). 2d. A bitter resin. 3d. An extract soluble in water, which yielded ammonia when heated with caustic potas. It afforded no tannin, scarcely a trace of gallic acid and no alkaloids.

The Copalchi bark analysed by Brandes, yielded a resin, concrete fatty oil, a bitter principle, on which its activity depends, but no alkaloid. Mercadieu found in it an astringent matter of deep brown color, an exceedingly bitter principle, no alkaloid, &c. &c. Mr. Howard also has analysed it with similar results.

The bark I have in my possession has been submitted to the following operation: 1000 grains of the bark yielded by distillation an oil which floated upon water and another heavier, which sank in water; it was bitter to the taste, and had the peculiar odor of the bark when bruised. 2d. Four ounces of the bark in coarse powder was treated with alcohol in a displacer, a dark brown tincture was the result; this was then evaporated upon the water bath, and water added as the spirit evaporated; upon cooling, a dark colored oil was found floating upon the surface, and a dark oleo-resin deposited upon the bottom of the dish. The oil floating upon the surface was carefully collected, and weighed 27 grains. The oleo-resin also was collected, and weighed 56 grains. They both possessed an exceedingly bitter taste and the peculiar aroma of the bark. The watery portion of the operation had also a bitter taste; it was filtered to separate resin, &c. With sesqui salts of iron, it gave no indications of the pre-

sence of tannin. To it acet. of lead was added as long as it gave a precipitate, then filtered and sulphydric acid passed through it to precipitate the excess of lead salt used, filtered and mixed with half its volume of ether and agitated for some time. After standing some time, to allow the ether to separate, it was poured off and left to spontaneous evaporation. A light yellow substance insoluble in water, soluble in alcohol and of an exceedingly bitter taste, was the result. I intend to treat it at some more convenient season, after the method of Duval for obtaining cascarillin, which bark (cascarilla) it much resembles, as far as its proximate constituents are concerned, and perhaps, also, its medicinal properties. We here find, also, a close similarity in the Malambo, the Copalchi and this unknown (to me) bark. Like the Malambo, it apparently contains no tannin, two oils of different specific gravity, a bitter principle, no alkaloid. The Copalchi resembles them, &c. And, to sum up the whole, the evidence is so conclusive to me, that I have no hesitancy in saying that the Malambo bark described by Ure, the Copalchi by Stark and Pereira as Corky Copalchi and the bark in question are identical.

Cincinnati, December, 1856.

REMARKS ON BOUTIGNY'S METHOD OF PREPARING PROTIOIDE OF MERCURY.

By JOHN CANAVAN.

PROF. PROCTER:—*Dear Sir,*—In the last number of your Journal, there are some remarks on M. Boutigny's process for preparing the protiodide of mercury, by Mr. Bullock, which attracted my attention, as a similar result has taken place under my own notice, which I think I can explain, at least satisfactorily to myself.

Having always prepared the above salt according to M. Boutigny's formula, and with success, I was surprised, a few days since, by a quantity shown me, prepared by an assistant, which contained large globules of metallic mercury. As it was too late to examine the washings, (not having seen it until in the drying process,) I questioned the assistant as to the manner in which he proceeded; he replied, he went exactly according to the "di-

rections in the book." Of this I had some doubts, owing in part to the time occupied in the operation.

I therefore concluded that the calomel and iodide of potassium had not been thoroughly triturated together, and that decomposition had not fully taken place before the addition of hot water. I am confirmed in this opinion, as another quantity prepared from the same materials and by the same person, but with a longer and more perfect trituration, gave no such result, but yielded a perfect protiodide, in which metallic mercury could not be distinguished even with the aid of a microscope.

I think the same opinion will hold good in Mr. Bullock's case; that from the large quantity of materials used, and the great difficulty of reducing the iodide of potassium to a powder fine enough for each particle to be acted upon by a particle of calomel, is a great deal in favor of my theory, that double decomposition had not fully taken place prior to the addition of hot water; and owing to the large quantity of iodide of potassium found in the washings, it seems to me, was another proof that the process of decomposition was arrested by the too early addition of the hot water.

The metallic mercury I account for as follows: A portion of the calomel having parted with its chlorine, the base had not had time, as it were, to combine with the iodine of the iodide of potassium; the mercurial salt in solution, I presume, was a portion of the protiodide of mercury held there by the iodide of potassium; but as these are only suppositions, not having time to look into the matter more fully, I give them for what they are worth.

I have never found any difficulty in making the protiodide of mercury according to M. Boutigny's process in small quantities, and taking care to use a great deal of trituration; and I doubt much whether it can be prepared perfectly in large quantities, such as those used by Mr. Bullock, which would require a very large mortar and a great deal of labor. All the forms of M. Boutigny I have seen, give the proportions in drachms, which is as much, I think, as can be prepared at once.

New York, Nov. 7, 1856

ON PROTIODIDE OF MERCURY.

BY JOHN M. MAISCH.

The last Journal of Pharmacy, on page 517, contained some remarks by Mr. Bullock on Boutigny's process for the preparation of iodide of mercury. Wittstein's Vierteljahresschrift, V. 536, publishes a paper on a similar subject by Oscar Lichtenberg, who tried J. B. Sobry's new (?) process, published in the Journal de Pharm. d'Anvers, 1855, 609, which consists in the double decomposition of calomel and iodide of potassium under the aid of water. Mr. Lichtenberg treated finely levigated calomel with a *solution* of iodide of potassium, and obtained—what was to be expected—a mixture of the protiodide, protochloride and metallic mercury, and comes to the conclusion that by Sobry's process the desired preparation cannot be obtained. There is, however, another way of manipulating in order to insure the double decomposition, viz: rubbing the dry articles *well* together and afterwards treating them with water. These are Boutigny's directions, who employs *boiling* water for decomposition and washing.

The protiodide of mercury is a very easily decomposable body, not only by the light, but also by other agents, as the following few quotations will show. According to Otto, it has little constancy, and from different causes is divided into mercury and the biniodide or sesqui-iodide; such causes are the treatment with hydriodic acid, iodide of potassium and similar iodides. Mitscherlich says: When heated gradually, it decomposes into mercury and the red iodide; the same result is obtained on treating it with a solution of iodide of potassium or other substances that have an affinity for the red iodide. This decomposition, according to Mohr, takes place by the action of many chemical preparations, especially by boiling it with hydrochloric acid, the iodides, sal ammoniac and common salt.

If the protiodide of mercury is treated with a solution of iodide of potassium at ordinary temperature, it quickly assumes a dark green, almost black color; a solution of chloride of potassium produces ultimately the same change, but far less rapidly; but at a boiling heat the decomposition is perceptible instantly. The ordering of hot water, therefore, must appear

unwarranted, and the employment of cold water for the completion of the reaction between calomel and iodide of potassium ought to furnish a purer product; the iodide, as well as the chloride of potassium being very easily soluble in cold water; the reaction can take place at once in the finely powdered and well mixed mass and the resulted chloride removed by filtration and washing. If the iodide of potassium is not well mixed with the calomel, a portion of it, after the admixture of water, will come in contact with the newly formed protiodide, and decompose this before all the calomel has been decomposed; this, undoubtedly, was the case in Mr. Bullock's undertaking, and in this way only may be accounted for the large amount of the red iodide of mercury obtained from the mother waters.

In view of the above facts and inferences the following experiments were made:—

1. The mixed powder was rubbed with boiling hot water, immediately thrown on the filter and washed with warm water.

2. The powder was treated with cold water, occasionally stirred, filtered after half an hour, and washed with cold water.

3. After the rubbing with sufficient cold water, the product was instantly filtered and rapidly washed with cold water.

In all cases the precautions were alike, viz: the iodide of potassium was free of carbonate; before weighing it was exposed to a dull red heat to destroy any iodate that might be present; it was rubbed to powder in a mortar mixed with calomel, and the whole then well triturated for ten or fifteen minutes to ensure an intimate mixture. For comparison of the results, the quantity of the materials were alike in the three cases; 60 grains of calomel were used to 41 grains of iodide of potassium. The whole was then put on a tared filter, the resulting iodide washed with distilled water as above, until the filtrate no longer precipitated a solution of nitrate of silver; then well pressed between bibulous paper to remove most of the moisture, and at last dried, either in a temperature of between 70 and 80 degrees, or in a current of dry warm air. During the whole of the operation, light was excluded as much as possible.

The reaction between calomel and iodide of potassium commenced as soon as they were mixed in the mortar, the powder assuming a greenish tinge, which was probably due to atmo-

spheric moisture. 60 grains of calomel must produce 83 grains protiodide of mercury, 41 grains of iodide of potassium ought to decompose $58\frac{1}{2}$ grains of calomel, consequently, by the above proportions, $1\frac{1}{2}$ grains calomel would be left unaltered, and the obtained product ought to weigh but 82 grains. The practical result, however, was, for the above three cases, 49, 56 and 50 grs. respectively. What, then, has become of the difference, which in all cases is about and even more than one third of the calculated result? The obtained powder was of an olive green color, almost without a yellow tinge, one of a very dark almost black hue, while, according to all authorities, the protiodide has a yellowish green color, which on exposure to light darkens to olive green, and at last black (Mohr). It was obvious that the product could not be protiodide, but that a decomposition had taken place, which made it probable that both iodine and mercury might be found in the filtrate.

On a clean copper plate a drop of the solution did not produce a silvery stain, and iodide of potassium no precipitate; protochloride of tin at first produced a white precipitate, changing to a grayish color on further addition; the precipitate formed by gradual addition of sulphuretted hydrogen showed the characteristic changes of color, yellowish, orange, brown and black. Thus the presence of mercury in the filtrate was established.

Sulphate of copper when added to the solution produced a whitish precipitate, leaving the supernatant liquor of a reddish brown color, which disappeared on the further addition of sulphate of copper and a larger quantity of protosulphate of iron; the precipitate was iodide of copper, and proves the presence of iodine, which also manifested itself by giving a scarlet red precipitate with corrosive sublimate.

The same reactions were obtained with the filtrates of the three preparations. Another experiment was then made by taking calomel in considerable excess, to see whether, with a part of it, iodide of potassium would produce protiodide of mercury without subjecting the latter to the decomposing influence of some unaltered iodide of potassium. Accordingly 60 grains of calomel were well mixed with but 35 grains of iodide of potassium, and this powder gradually added to water and triturated with the same. A green powder resulted, and the filtrate showed the

behaviour of those formerly obtained; it also contained iodine and mercury.

Any of the green product, when treated with cold diluted nitric acid, assumed a lighter color, and the filtrate contained mercury; for, on oversaturating it with potassa, a yellowish precipitate was thrown down, and hydrosulphuric acid produced a black precipitate. The powders, therefore, contained metallic mercury in minute division.

The conclusion we have come to, from the above experiments, is, that it is *impossible to obtain pure protiodide of mercury by the reaction of iodide of potassium on calomel*, no matter how it may be manipulated.

In preparing the protiodide of mercury we have, therefore, to fall back on the process directed, I believe, by all Pharmacopœias, of combining the elements by trituration. For this case, however, there is a deficiency in the officinal direction. Mohr asserts that some red iodide is present in the product, even if less iodine be taken than required for the conversion of the mercury into the protiodide, and treating the yellowish green powder with boiling hot alcohol was indispensable. I have found, however, that even with this precaution a pure article is not obtained. When the protiodide, as made by this process, is left in contact for some time with diluted nitric acid, the presence of mercury can be proved in the filtrate by any of the above mentioned tests. To get rid of the metallic mercury with which the preparation is contaminated, it must be treated with dilute nitric acid and afterwards with hot alcohol, to remove any biniodide present; then only is it in the state of purity in which the physician expects it. But how long will it remain in such a state? After weighing out from the bottle several times, if the operation is not performed in the dark, it must contain a detectable quantity of mercury, which probably would not unfit it for internal use, if at the same time another iodide was not formed. The best plan, it seems to me, to keep it unaltered, would be, after careful preparation, to have it put into black vials each containing not over one or two drachms.

NOTE ON MERCURIAL OINTMENT.

By E. H. HANCE.

MR. WM. PROCTER, JR.:—*Dear Sir*,—Having noticed various plans for expeditiously reducing mercury in the manufacture of mercurial ointment, none of which have proved very practical, I offer the following process, which, to my knowledge, has never before been proposed:—

R. Hydrargyri,	. . . . .	℥iv.
Cetacei,	. . . . .	℥ss.
Adipis,	. . . . .	℥ij.
Sevi,	. . . . .	℥iss

First, slightly warm the mortar, then introduce the mercury, and to this gradually add the spermaceti previously melted, constantly triturating the mixture; the mercury will almost immediately become reduced into very minute globules, and, as the mixture hardens, add a small portion of the lard, and triturate briskly for a few minutes, when the mercury will become entirely extinguished, then gradually add the remainder of the lard and suet.

The above method I have repeatedly tried in small quantities with great success, but in manipulating with large quantities, do not succeed so well.

Thinking the above formula may be of benefit to retail apothecaries, I offer it to you for publication in the "American Journal of Pharmacy."

Philadelphia, Oct. 22, 1856.

EXAMINATION OF GRAIN WEIGHTS.

By EDWARD R. SQUIBB, M. D., U. S. N., Assist. Director Naval Laboratory.

Some time since, the writer had occasion to examine the different kinds of grain weights that are sold in the market, with a view to determine the most reliable for ship-board dispensing. The appearance of these weights is generally such that no great degree of accuracy would be expected in them; but they are really so inaccurate as scarcely to deserve the name of weights.

From this circumstance, it appears important that dispensers

of medicine should know something of the character of these weights, and hence this notice.

Three kinds are met with in the market ; two called German and English, marked in the old way, with a number of ciphers corresponding to the number of grains, and an additional standard mark. These are sold at a very low price. The third variety is much higher in price. These are marked with figures, and found packed in turned wood boxes.

In the examination no notice was taken of variations from the standard of less than one-sixteenth of a grain.

The so called German set consisted of twelve weights from one-quarter to ten grains, wrapped in grey paper. They were all inaccurate except one. Six of them were too heavy by one-eighth to one-quarter of a grain, and five too light by one-sixteenth to one-eighth of a grain. The one grain weight weighed three-quarters of a grain, and the quarter grain weighed nearly three-eighths of a grain.

The English set consisted of seven weights from half a grain to six grains, and were also wrapped in bluish grey paper. These were all inaccurate, but not so far out of the way as the last, except the small weights. The one grain weight weighed $1\frac{1}{4}$ grains, and the half grain weighed nearly five-eighths of a grain.

Neither of these varieties agreed any better among themselves or with each other than with the standard, for in one instance a two and three grain weights weighed nearly one-sixteenth of a grain more than the six grain of the same set, and nearly five and a half of the other set.

The third variety, sometimes called American, but probably German, consisted of thirteen weights, from one-sixteenth to ten grains. These are much better finished ; have a figure stamped upon them for the denomination, and are turned up at one corner for more convenient use with forceps. These are put up in small, turned wood boxes. They are much more accurate than either of the others. Three of them were about one-eighth grain light, and one about one-eighth grain too heavy ; all four being above the denomination of five grains. The remainder were tolerably accurate.

Persons who buy weights, but who have no standard for comparison, may judge of the reliability and accuracy of any given

set within practical limits, by observing whether they agree among themselves; for it is rare to find weights that are carefully adjusted among themselves that have not had the same degree of care in relation to the standard.

Naval Laboratory, New York, Dec. 10, 1856.

CHEMICAL AND PHARMACEUTICAL MANIPULATIONS; a manual of the Mechanical and Chemico-Mechanical operations of the Laboratory, for the use of Chemists, Druggists, Manufacturers, Teachers and Students. Second and enlarged edition. By CAMPBELL MORFIT, Professor of Analytic and Applied Chemistry in the University of Maryland, and CLARENCE MORFIT, Assistant Melter and Refiner in the United States Assay Office. With 537 illustrations. Philadelphia: Lindsay & Blakiston, 1857. Pp. 626.

In our 21st volume we noticed the first edition of this excellent manual, and are glad to announce the appearance of the second, with 114 additional illustrations, and 144 additional pages of letter press.

The whole work appears to have been carefully revised, and several new chapters have been added. The chapter on the polarising instruments for analysing saccharine substances, is wisely omitted, being scarcely appropriate in a work on the manipulations of the laboratory. We question the appropriateness of the chapter on barometers, which takes its place. We think the space could have been better filled with details of processes and manipulations.

The importance of such works as this of Professor Morfit, is more and more felt in our profession, and the present edition will no doubt have the wide circulation to which its merits entitle it.

The American pharmacist has not unfrequent calls upon his ability as an analytical chemist, and it should be his aim to cultivate in his apprentices those habits of careful manipulation and patient accuracy which are the foundation of all practical ability in the science of chemistry. A pains-taking youth, with sharp eyes and pliant fingers, cannot fail to become a skilful analyst with frequent practice and the aid of a manual like the one before us. The great requisite for success is PATIENCE—patience in observing—patience in waiting for the full finishing of a process—patience in trying over and over again an unsuccessful experiment or an unsatisfactory analysis. Some of the

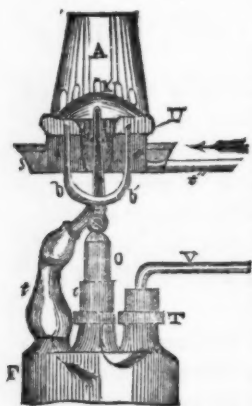
best analytical chemists in the world have been self-taught, and we do not doubt that a young man can accomplish himself in the shops of our best pharmacutists at home, as a competent and skilful analyst.

Our space will not permit us to say more. We subjoin some of the new matter in this edition which appears to us valuable and interesting :—

Deville's Blast Lamp.—This implement, the invention of St. Clair Deville, is designed for producing high temperatures with the use of alcohol, wood spirit, kerosene, camphene, and similar fluids, as fuel. Those hydro-carburets which have the lowest boiling-point and give the densest vapors, afford the greatest heat. The lamp is applicable for fusions, fluxing, and ignitions, and a few seconds only are necessary to raise the heat equal to that of melting iron.

Fig. 161 is a drawing of the apparatus. "It consists of a reservoir *r*, with

Fig. 161.



three tubulures above, *r t t'*. By means of the blast of a blow-pipe table, the air is injected into *r* through the tube *v*, which is inserted in *r*. The tubulure *t* carries the vertical tube *o*, which has a stop-cock at *n*, and divides above into two arms *b b'*, which pass into a metallic box *u*, and terminate in its upper part with open extremities cut off obliquely. The box *u* contains the burning fluid *e* partly filling it; and it connects with a reservoir by *t'*, which is kept at a constant level. The centre of this box is a cylindrical tube, closed below, through which passes the blow-pipe *c*, a continuation of the tube *t'*, the left tubulure (in the figure) of the flask *r*. The tube which is at the middle of box *u*, and envelopes the blow-pipe *c*, has several small holes *u u* communicating with the empty (or upper) part of

the box *u*.

"Above the blowpipe, and resting in a furrow in the top of the box *u*, there is a copper cup *k*, pierced at the centre with a hole for the passage of the jet of vapor which escapes from the holes *u u u*, after the bellows are put in action.

"To prevent the burning fluid from becoming too much heated there is a trough *s* containing water. Before lighting the lamp, the fluid in *L* is heated till the water in the trough boils; then the bellows are made to act, and the jet of vapor is lighted; after which the heat disengaged by the lamp is sufficient to continue the vaporization of the fluid.

"Above the box *u* there is a chimney *A* having a series of holes around near its bottom for drawing in air on the flame of the apparatus."

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"A much more convenient implement than the preceding is the lever press, described in Muspratt's Chemistry, and a perspective view of which is shown by Fig. 375. It consists of two wrought-iron pillars *n n*, supported in sockets by the cast-iron feet *a a*. The bed-piece *c* is also secured to the feet by two perforated ears, and has two intersecting grooves sunk into its surface, as channels for conducting off the expressed liquid. The follower *d*, corresponding in size with the bed-piece *c*, is adjusted to the pillars by sliding-cars, and has the rack-bar *f* fixed in the centre. The gearing is sustained by framework *e* attached to *n n*. Motion is effected as follows:—The ratchet-wheel *g* turns upon an axle having its bearings in the top frame. On the same centre is a fixed pinion of eight teeth, only partially

Fig. 375.



seen in the figure, which works in the wheel *i*, of twenty-four cogs; and upon the axis of *i* is another eight-teeth pinion, which acts upon the rack. The lever *k* is forked at the extremity nearest the small winch-handle *l*, and the terminations of of the furcation are received upon the axle *a*. A pin, near *n*, is adapted to a small hole in the frame, by the insertion of which the descent of the lever may be prevented. The matter to be pressed is placed in a shallow, cylindrical box *a*, of tinned copper, Fig. 376, which rests upon the bed *c* of the press. To prevent the contents from being pressed against the sides of the cylinder, and thus abstracting the flow of the liquid thence, it is necessary to use a perforated band with perpendicular ribs on the exterior. Being movable and formed of two parts joined together by

Fig. 376.



a hinge, it can be easily put in proper position around the matters to be pressed (after the latter has been placed in the box), and fastened by means of the pin. The ribs on the outer circumference of this band project against the inner sides of the box, and form intermediate grooves, through which the expressed liquid, issuing from the holes, can readily pass off into the receiving vessel at the spout beneath.

To put the press in action, the lever being upheld by the pin at *n*, the winch-handle is turned to the left, in order to lower the rack and follower, until the latter presses upon the wooden block *b*, Fig. 376, which caps the material under pressure. The lever is then raised, and the pall allowed to work into the ratchet, which will cause the latter to turn, and produce the descent of the rack. This is repeated, if requisite, until a considerable pressure is obtained; and should it be desired to go on, the lever is elevated considerably above the horizontal line, and left to follow the consolidation of the contents of the bag. If, however, this is unnecessary, the pin *n* is inserted, upon which the lever remains. The amount of pressure is also regulated by the disposal of the weight *m* in the various notches of the lever.

When it is not expedient, as in the case of pulpy and similar matters, to press the substance in the box without first enveloping it in a cloth, it may be wrapped in unbleached Russia canvass; and the bag-shape bundles thus formed placed in the box, with a stiff plate of tinned copper interposing every two of them. They should be folded so as not to make a thickness of more than an inch.

As the cloths absorb a considerable quantity of the expressed juice, and occasion loss, the pressing should be accomplished without them in all possible cases. The cloths, used for confining substances from which oily liquid is to be expressed, must be woollen and thick.

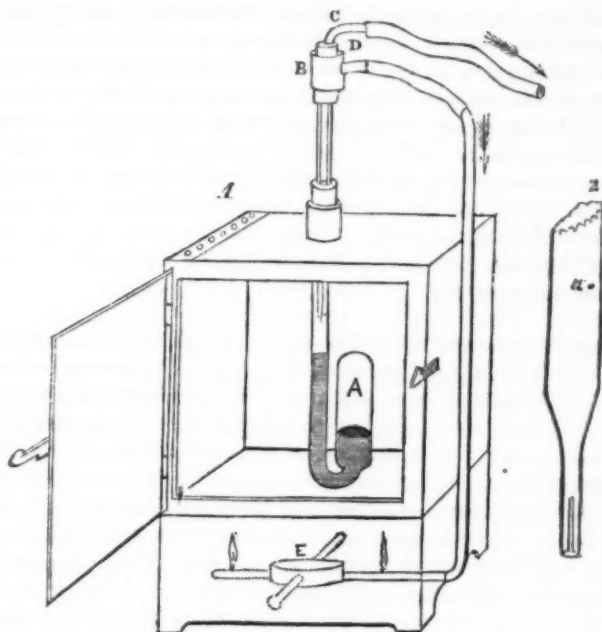
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Kemp's Thermostat.—When street gas is used for heating the air-baths, it is apt to give unequal temperatures, owing to the variable pressure upon the service-pipes at different times. To prevent this annoyance, Kemp has devised a most convenient and efficient apparatus, which he properly designates a *Thermostat*, as it regulates the supply of the gas to the burner, and of course the amount of heat thus applied to the substance under process, thereby insuring a constant temperature for any length of time.

This simple and ingenious apparatus will be found serviceable for all operations requiring a prolonged temperature of great uniformity. The author used it successfully in promoting tedious fermentations, artificial incubation, and for obtaining products of the decomposition of organic bodies at fixed temperatures. The use of mercury renders it available only for temperatures below the boiling-point of that metal; but by making the instrument of iron and substituting fusible alloys for mercury, it becomes applicable for higher degrees.

The instrument itself, shown in the following drawing, consists of an air-thermometer, *B A*, of glass, and containing mercury in the lower part of the bulb *A*, and a portion of the stem *B*. A tube of smaller diameter, as seen in the figure, passes down the axis of the tube *B*, the annular space being

Fig. 387.



made air-tight by a small brass stuffing-box *B*, which enables it to be retained at any required elevation. An air-tight connection is made at *C* with a piece of flexible caoutchouc tube, communicating with the service-pipe by means of a gallows-screw. The gas entering through this channel passes into the long stem of the thermometer, and thence to the burner *D*.

In using the instrument, the bulb *A* must be immersed in the water-bath with the substance under examination, if that means of heating is employed; and, in the case of an air-bath or hot press, it must be placed in immediate vicinity of the substance, so as to produce an equilibrium of temperature between the air in the bulb and the surrounding atmosphere.

The inventor thus explains its mode of operation. Supposing, for example, that it is required to keep an object at a temperature of 100° F., then the bulb of the instrument being placed contiguous to the object, a free supply of gas is allowed to flow through the burner, and a flame ignited. The heat soon begins to act upon the air in the bulb, causing it to expand

and force the mercury up the stem *n*; and when it is found, by the use of a common thermometer, that the heat has risen to the required degree, the inner and smaller tube is to be pushed down until its lower extremity reaches below the surface of the mercury. This would, of course, cause the flame to be extinguished; but, as the preventive of this occurrence, a small hole is bored through the inner tube above the extremity, to permit the transit of a small quantity of gas to the burner. As the passage of the gas is now interrupted, the source of heat is withdrawn, and the cooling influence of the surrounding air then causes the air contained in *a* to contract, and the mercury in *n* to sink, and leave the end of the internal tube uncovered. A free channel for the gas is thus opened, so that, as combustion proceeds, the temperature would again rise and cut off the supply; but, in a short time, these two opposing forces reach an equilibrium, and scarcely any variation in the size of the flame occurs. To insure perfect contact of the end of the inner tube with the mercury, the former, to the extent of a half inch, is made of platinum, and amalgamated by dipping it into a liquid amalgam of sodium and mercury.

* * * *

ELECTRO-METALLURGY.—The deposition of metals by electric action is one of the modern triumphs of practical chemistry. The art dawned in 1805 with the discoveries of Brugnatelli; but no substantial benefits were derived from it until 1838, when Jacobi, of St. Petersburg, and Spencer, of England, applied the principle to the utilitarian purposes of life. The subsequent invention of Daniell, by his well known battery, gave an impulse to the art which resulted in many gratifying and wonderful improvements; so that now it has become, in its greatly advanced condition, a prime element of the economy of many branches of manufacture. Plating, gilding, stereotyping, medal copying, engraving, and kindred arts, are all largely indebted to electro-metallurgy for many of the facilities which at present promote and distinguish their progress.

Those who may wish to experiment in this interesting branch of scientific art will find ample instruction in the following pages.

Any of the many forms of batteries previously described may be used for electrotyping, but the best is Smee's. Care should be taken to observe the directions heretofore given for the treatment and management of batteries; their good condition, proper arrangement and management, being necessary to success.

The intensity and quantity of the galvanic current should be proportional to the work to be done.

Preparation of Articles to be Plated or Copied.—In gilding and silvering, it is merely necessary to have the objects perfectly clean and bright. This is effected by first boiling the articles in a solution of caustic soda or potassa, and afterwards immersing them in dilute nitric acid, and rinsing with water. They are further cleaned by rubbing with a hard brush, and sometimes a little fine sand or tripoli.

Moulds.—Many substances are used for making moulds ; among the best are beeswax, plaster of Paris, fusible metal, and gutta percha.

Wax moulds are prepared by melting the wax over a water-bath, and stirring in one ounce of white lead to each pound of wax. The wax should be clear and free from impurities.

If the object to be copied is a medal, it should be brushed over with sweet oil, and the excess of oil removed with a cloth. A slip of metal or card is bound round the edges of the medal, so as to form a rim. The wax being melted, the medal, to prevent air-bubbles, is held in an inclined position, and the wax, which should not be too hot, poured gently on the lowest part, and allowed gradually to spread over the surface of the medal by bringing it to a level when it is filled to the top of the rim with wax. As soon as the wax begins to set, the band should be removed to prevent cracking. Let the medal and wax remain together until entirely cold, so that they may be easily separated.

If it is desired to take a wax mould from a plaster-cast or medallion, a similar course is followed, the medallion being first prepared as follows: the medallion is warmed a little, brushed over with boiled linseed oil, and allowed to dry perfectly. It then presents a polished appearance and is ready for the wax.

Instead of oil, water is often used ; the plaster being saturated with it by placing the back of the medallion in the water, care being taken not to allow the water to flow over the face of the medallion.

Plaster of Paris moulds are made by mixing the finest calcined plaster with water, to form a thin paste about the consistence of cream. A little of this paste is poured upon the object and well brushed into every part with a camel's hair brush, and then more of the paste is added to produce the requisite thickness. It is allowed to set and dry; the drying can be facilitated by heating in an oven or otherwise.

The fusible metal of which moulds are frequently made is an alloy of five parts of lead, three of tin, and eight of bismuth, and melts below 212° F.

Care and practice are requisite for producing a good and sharp casting ; and the metal must not be poured too hot. Commence by pouring sufficient of the melted alloy into a suitable vessel,—taking the precaution to skim the *dross* from the surface of it with a card,—and when it is nearly congealed, bring the matrix down upon it quickly and with considerable force, and let it remain until the mass has perfectly cooled. When done with skill, a reverse will be obtained with all the sharpness and perfection of the original.

Gutta percha is probably the substance best adapted for taking moulds for electrotyping. It is applicable to metal, wood, glass, stone, &c. It needs only to be softened by heat either in warm water or by a steam-bath, spread into suitable form, laid and pressed upon the object to be copied, and allowed to cool under the pressure, when the mould will be fit for use.

Sulphur is sometimes used for moulds ; and very beautiful impressions

can be made also with sealing-wax, which takes the minutest lines of the original. Reverses may be procured in lead by forcing the matrix into a bright surface of it, either by pressure or blows.

Non-conducting Substances.—As gutta percha, wax, plaster of Paris, and many of the materials used for making moulds are non-conductors, it is necessary to coat the surface on which it is desired to deposit metal with some conducting substances. The best and easiest of application is plumbago or black lead. A copper band or wire is fastened around the edge of the mould, and the ends formed into a hook, or punched with holes, to make the connection with the battery. A fine brush is dipped into the plumbago and passed thoroughly over the face of the mould, all excess of black lead being carefully removed, and the brushing continued until every part is covered and brightly polished. This treatment will insure a quick and even deposit. In wax moulds it is only necessary to insert, in the edge of the mould, a piece of copper by which to attach it to the battery-pole. In every case, however, the conducting coating must extend to and be in contact with the battery connection. In using metal moulds, those parts on which metal is not to be deposited should be covered with wax or some kind of varnish.

The battery connection is most conveniently and perfectly formed by soldering a copper wire, flattened, at one end to the metal mould.

Bronze powder is sometimes used instead of plumbago and in the same manner. Flowers, and other objects to which plumbago is not applicable, may be rendered conducting by a film of gold or silver. This is applied through the medium of a solution of phosphorus in bi-sulphuret of carbon. The solution is made by dissolving 1 ounce of phosphorous in 15 ounces of bi-sulphuret of carbon, and adding thereto 1 ounce of wax, 1 ounce of asphalte, 1 ounce of spirits of turpentine, and 1 drachm of india-rubber. The india-rubber must be dissolved in turpentine, and the asphalte in the phosphorous solution. The wax is melted first, the turpentine and india-rubber stirred in, and then the asphalte and phosphorous solution added.

This should be done with caution over a water-bath, as the components are highly inflammable. The bi sulphuret of carbon being very volatile, the solution should be kept in a well-stoppered bottle. "The solution, as above prepared, is applied to the surfaces of non-metallic substances by immersion or brushing; the article is then dipped in a dilute solution of nitrate of silver or chloride of gold; in a few minutes the surface is covered with a fine film of metal, sufficient to insure a deposit of any required thickness on the article's being connected with a battery. The solution intended to be used is prepared by dissolving 1 ounce of silver in nitric acid, and afterwards diluting with 3 gallons of water; the gold solution is made by dissolving 2 pennyweights of gold in aqua regia, and then diluting with a gallon of water."

Gold Solution.—Convert a half ounce of gold into terchloride, dissolve the

gold salt in a little water, and add it to a solution of four ounces of cyanide of potassium in two quarts of water and filter.

Silver Solution.—Take of cyanide of silver 1 ounce, cyanide of potassium 10 ounces, water 6 pints; dissolve the cyanide of potassium in the water, add the cyanide of silver, and filter the solution.

Probably a better way to make the solutions of gold and silver in cyanide of potassium is with the battery. Immerse, in a solution of 1 part cyanide of potassium to 16 parts of water, a silver plate, connected with the positive pole of a battery, complete the connection with the negative pole, and keep up the action of the battery until silver is freely deposited on the negative pole. The same process is followed for gold, care being taken to substitute a gold for a silver plate.

Sulphate of Copper is the best salt for the reduction of copper. A nearly saturated solution, acidulated with a few drops of sulphuric acid, is used. One pound of the sulphate in six pounds of water is a good strength.

Cyanide of Copper is sometimes used for depositing copper or iron. It is made by dissolving the oxide in an excess of cyanide potassium, or by making a sheet of copper the positive pole in a solution of cyanide of potassium.

Platinum, zinc, and most of the metals can be reduced from their salts by the battery; but for electrotyping they are seldom or never used.

To have the metals adhere well in gilding and silvering, the articles to be plated must be well cleansed. As silver is generally precipitated on copper, the article is boiled in caustic potash or soda well rinsed with water, dipped in dilute nitric acid, afterwards immersed in a weak solution of nitrate of mercury, and immediately placed in the silvering solution. Gold is usually deposited on silver. The silver object is treated as before with caustic lye, rinsed, and, when dry, is thoroughly scratched with a scratch-brush, which is a bunch of fine wire made into a brush. It is then ready for the battery. In gilding, the solution should be maintained at at about 150° F. by a water-bath.

To avoid opposite currents of electricity in the depositing solution from an exhaustion of the solution around the negative pole, and a dense solution forming around the positive pole, the articles should be kept in motion during the deposition; for this motion also prevents that crystalline deposit deemed so objectionable.

To prevent the adhesion of the matrix to the deposited metal, Mr. Mathiot, of the United States Coast Survey, recommends that the engraved copper plates, &c., be coated in a battery with a thin film of silver, and afterwards washed with a dilute solution of iodine in alcohol,—about one grain of the former in a quart of the latter.

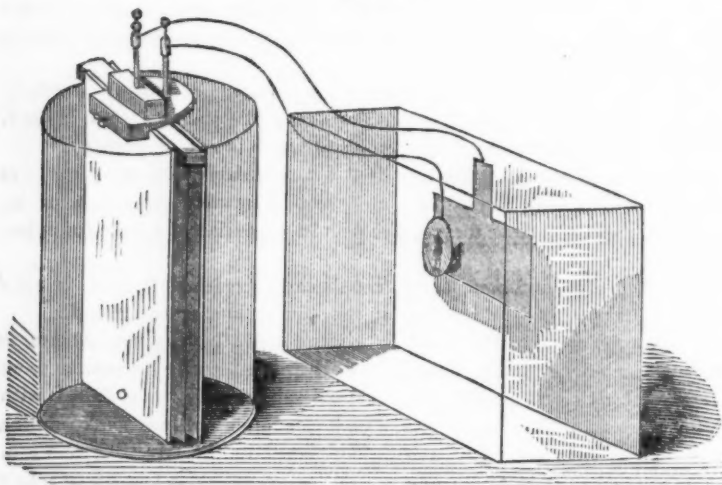
Dusting with black lead, or spreading a little oil over the surface of the article, care being taken not to use an excess, will cause the metals to separate easily. A little wax dissolved in spirits of turpentine also answers well.

Solutions should be kept covered from the air and dust; and the working of the batteries is promoted by having the surrounding atmosphere of a warm temperature.

A few drops of bi-sulphuret of carbon added to a silver solution will produce a bright deposit.

In inserting the articles in the solutions the air adhering to their surfaces, and which prevents a contact of the metals, may be dispelled by moving the articles about in the liquid or by heating the solution.

Fig. 475.



The plates attached to the positive poles should be parallel to the articles on which the metal is to be deposited and present the same amount of surface.

A battery, if in proper working order, will, when the connections are made, show a disengagement of gas at its negative metal; but no gas should be seen to escape at either pole.

Bronzing.—To give the copies of medals and other objects an antique or bronzed appearance like the original, several means are employed. A dark bronze is produced by dipping the object in very dilute nitric acid,—say half an ounce of acid to a pint of water,—and, after drying, heating it gradually and uniformly. The color is deepened in proportion to the heat applied. Sulphuretted hydrogen or hydrosulphuret of ammonia may also be used. Afterwards polish with a brush. Green bronzes are formed by immersing the articles in a solution of chloride of ammonium or chloride of sodium, or by exposing them to the fumes of chloride of lime. The depth of the bronze is regulated by the length of time during which the articles are subjected to the galvanic action. A coating of black lead and subsequent heating of the article, gives a beautiful bronze. A thin film of oil or wax,

and heating until the grease commences to decompose, produces a good bronze. Immersion in a solution of chloride of platinum also gives a handsome bronze.

D. B. S.

ON VALERIANATE OF AMMONIA.

By WILLIAM PROCTER, JR.

Within two months past a demand has arisen for the valerianate of ammonia, owing to the publication in the Medical Examiner of a notice of its successful employment in severe facial neuralgia by certain French physicians. Having been applied to for this substance, and having studied the subject to some extent, the following remarks bearing on the preparation and properties of the salt are offered to those desiring the information.

When valerianic acid, as it occurs in commerce, is neutralized with strong solution of ammonia, and the liquid is carefully evaporated at 150° F., a syrupy liquid results, which is a dense solution of the valerianate of ammonia. If left to stand for some time it shows little, if any, disposition to crystallize, especially if the atmosphere is moist; but under favorable circumstances crystallization occurs, and the solution becomes a mass of crystals.

After several trials, the following method was adopted which proved successful. After concentrating the aqueous solution, it was mixed with twice its bulk of alcohol of 95 per cent., and suffered to evaporate spontaneously. In a few hours, as the alcohol disappeared, crystallization took place without difficulty. As valerianic acid is expensive, and the use of this salt will depend much on its being obtained at a reasonable price, it will be preferable to make the acid and salt in one operation, which can be economically done by the following process, which I have found to yield a nearly pure product.

Take of Bichromate of Potassa, eighteen drachms,
Sulphuric acid, thirteen fluid drachms,
Fusel oil (Alcohol Amylicum), a fluid ounce,
Water, a pint,
Solution of ammonia, a sufficient quantity.

Reduce the bichromate to powder in a mortar, add the acid

mixed with an equal bulk of water and triturate, and then the remainder of the water, so as to get a clear solution. Pour this into a quart flask, add the fusel oil and shake them together at short intervals, until the reaction has abated and the temperature decreased. Then attach the flask to a Liebig's condenser (or use a retort and receiver), apply heat, and distil a pint of liquid from the mixture. The distillate (which consist of a watery solution of valerianic acid, with an oily mixture of valerianic acid and valerianate of oxide of amyl, or apple oil, floating on its surface) should then be put in a flask, and solution of ammonia added with agitation, until in slight excess, and the liquid ceases to redden litmus paper. The apple oil floating on the surface should then be removed, and the solution evaporated on a water bath till syrupy, mixed with alcohol, as before noticed, and set aside to crystallize.

A very neat process is to pass gaseous ammonia through syrupy valerianic acid till super-saturated, and then, after slightly heating the dense solution, to remove the excess of ammonia, crystallizing by aid of alcohol, as above.

Valerianate of ammonia is a colorless salt, crystallizing in very thin micaceous quadrangular plates, soluble in water and alcohol in all proportions. When added to washed ether, a part of the salt seizes on the water and attaches itself to the sides of the vessel, whilst another is retained by the ether. Its taste is at first sharp, and then sweetish, its odor slightly valerianic, like valerianate of soda. When its aqueous solution is boiled, ammonia is perceptible in the vapor. According to Lowig it volatilizes without decomposition, and Gregory gives it the formula $\text{NH}^4, \text{O} + \text{C}^{10} \text{H}^9 \text{O}^3$. Although very soluble, this salt effloresces when exposed to the air. I have not determined its amount of water of crystallization, nor have I been able to find any statement of the dose of the salt, as the paper in the Examiner speaks of a "solution" without noting its strength.

FLUID EXTRACT OF LUPULIN.

By THE EDITOR.

For the convenience of prescribing, a fluid extract of lupulin has been offered to the physician by some of our pharmacutists, and

the strength has varied from half an ounce to an ounce in each fluid ounce. By the researches of Personne, lupulin contains about one per cent. of valerianic acid, a volatile oil, and a considerable quantity of yellow resin, besides a bitter principle; hence, in treating lupulin to get a concentrated solution, it is necessary to adopt a process that will retain the volatile principles in the preparation when finished. The following process will accomplish this end:

Take of Lupulin, four ounces (Troy),

Alcohol,

Rectified ether, of each a sufficient quantity.

Put the lupulin in a glass displacer, pour upon it four fluid ounces of ether, and then sufficient alcohol to gain six fluid ounces by slow percolation, and set the liquid aside. Then continue the displacement with alcohol till ten fluid ounces of liquid passes. Evaporate this to two fluid ounces and mix it with the ethereal tincture and by means of a heat of 100° Fahr., or spontaneously; let the ether evaporate, so that the resulting fluid extract shall measure four fluid ounces. As a minim equals a grain of lupulin, the physician can easily regulate the dose.

CONTRIBUTIONS TO TOXICOLOGY.

Translated from Wittstein's Vierteljahreschrift by J. M. Maisch.

On the recognition of Phosphorus. By F. VIELGUTH.

When making a chemico-legal investigation on the corpses of two children supposed to have been poisoned by phosphorus, the author mixed a little phosphorous paste with some victuals, and after leaving it in a loosely covered vessel for two months, found the mixture dried to a hard cake, covered with a green mould and possessing a mouldy odor devoid of phosphorous smell, even when freshly broken. But on heating some of it with hydrochloric acid, white vapors of phosphorus acid were evolved, and after triturating and washing another part, several globules of phosphorus could be separated. The balance of the dry mass was again set aside for four months, when muriatic acid still generated white phosphoric vapors, but no globules of phosphorus could be separated by triturating in a mortar; on the pestle, however, were a number of small spots, hardly recognizable by

the naked eye, which could be separated by a sharp knife, and proved to be phosphorus. Thus it was possible, in victuals containing phosphorus, to prove its presence after a lapse of six months.—*Wittstein's Vierteljahresschr.* v. 377.

Chemico-legal analysis of Blood. By DR. G. C. WITTSTEIN.

In the trial of a man charged with the murder of a female, the author had to prove the identity with blood of red stains found on his garments, and on an axe and its handle. The stains were scraped off with a knife, or where that was impossible, were dissolved out by water, and the solution evaporated at a very low temperature.

1. The substance was heated in a glass tube; it became black, and gave off thick white vapors, smelling like burning feathers, and browning curcuma paper, which color disappeared on lying in the air.

2. It was gradually heated to redness with a little sodium, the residue dissolved in water, filtered, mixed with a few drops of a solution of proto- and peroxide of iron, and over-saturated with muriatic acid; which caused a precipitate of Prussian blue.

3. A watery solution was heated to boiling; it separated a brownish grey coagulum, which disappeared on the addition of caustic potassa; the liquid now had a greenish color.

4. A solution was mixed with chlorine water; it was decolorized, and white floccules were separated.

5. On the addition of nitric acid, a greyish, finely flocculent precipitate took place.

6. Tannic acid produced a greyish precipitate with a tinge of violet.

The axe and its handle had evidently been washed; a few spots on the handle could not be dissolved in water, but caustic potassa took them up; at the same time, however, the liquid became of so dark a color that it was unfit for testing it. What little remained on the iron was carefully scraped off; an admixture with iron rust could not be avoided, which remained behind on heating with caustic potassa; chlorine decolorized the alkaline liquor and precipitated white floccules. The scrapings were, however, *insoluble* in pure water, thus proving Rose's experience of the insolubility of the red coloring matter of blood in water, in the presence of oxide of iron, to be correct.

The author also corroborates Rose's statement, that earthy matters render the red coloring matter insoluble in water ; but on the green liquor, No. 3, he could not observe the dichroism of which H. Rose speaks ; also in an alkaline solution of fresh coagulated ox-blood, he could see but a faint red color in reflected light, although he experimented with concentrated and diluted solutions.—*Wittstein's Viert. J. Schr.* v. 382-389.

On Carbonic Oxide. By ADRIEN CHENOT.

Carbonic acid not being decomposable at ordinary temperature, is incapable of furnishing the necessary oxygen for the support of life ; it therefore acts by *obturation*, and destroys life by asphyxia. It is different with carbonic oxide. This gas, in oxidizing to carbonic acid, has a three-fold action : 1, by taking away oxygen ; 2, by burning the same ; and 3, by the formation of carbonic acid.

These actions are inseparable from each other, and the last produces asphyxia by the cessation of the activity of the lungs ; but in the same time oxygen has been condensed, and the vacuum thus established causes compression and bursting. Besides this, 6,000 units of caloric litre oxygen are developed within the body by the oxydation of carbonic oxide, and in this way the organs are cauterized, which explains the extreme agony accompanying a poisoning with carbonic oxide, while on the contrary carbonic acid produces an agreeable intoxication, increasing to a soothing lethargy without any tormenting sensation.

Contrary to many statements in books, the carbonic oxide of ordinary combustion, containing four to six per cent. of nitrogen, is but a mild deoxidizer, and unable to deprive the oxides of the metals belonging to the iron-group of their oxygen. Still it is a somewhat dangerous poison. The *pure* carbonic oxide, however, is not only a strong deoxidizer, but also a violent poison, acting with the rapidity of lightning.

The author then relates a case of poisoning caused by the accidental inhalation of some of the gas, and gives the *external effects* as—1, prostration, as if struck by lightning ; 2, eyes distorted ; 3, extremities contracted ; 4, skin pale ; 5, veins swollen and shining black through the skin. The *internal effects* are—1, sensibility very much increased ; all ideas, the chief interests,

all prevalent affections are shown to the mind as if it were by an immediate reflection ; 2, intense pains are felt in the chest, as if something was forcibly torn out of it ; the brain is affected by a heavy pressure, which is either a primary effect or else the result of the influence of the pains on the nervous system.

In the open air he was washed with water and vinegar, and given ammonia to inhale ; after 15 minutes feeling commenced slowly to return, accompanied by internal pains, which soon gave way to a sensation of suffocation, together with coldness and considerable perspiration of the whole body, but especially of the head. For several days he was very feeble and suffered from indigestion, but also loathed all victuals ; his sleep was light, but continually and dull, often interrupted by cramps in the knees and toes. These symptoms gradually diminished, but for months afterwards left their marks ; he felt weak, dejected, food was distasteful, and he was afraid of an unexpected noise, which would give him a shock like an electric discharge ; afterwards a kind of numbness set in, particularly in the ends of the fingers, which varied in intensity with the state of the atmosphere.

At another time, by the breaking of a manometer-tube, the author experienced the same symptoms internally ; but he did not fall down, and remained in a half conscious state. Drinking of marshmallow and gum water for several days relieved him internally ; but from the affections noticed above he suffered severely for a long time afterwards. The author cautions all who intend to experiment with this gas.—*Gazette Médicale de Paris*, 1854.

On an Antidote to Phosphorus.

Duflos had proposed in cases of poisoning by phosphorus to administer hypochlorite of magnesia, together with magnesia, and Bechert, who experimented with it, thought it available for that purpose. Dr. Schrader, of Göttingen, however, (*Archiv der Pharm.* lxxx., 165,) found it impossible to save with this remedy any one of the eight rabbits with which he experimented. Hofmann, apothecary in Schlotheim, (*Arch. d. Ph.* lxxxiii., 146,) with two experiments arrived at the same result.—*Wittet. V. J. Schr.* v., 125.

ON THE TREE PRODUCING RED CINCHONA BARK.

BY JOHN ELIOT HOWARD, Esq.

It has long been a desideratum in Quinology to ascertain the botanical origin of this article of the Pharmacopœia which is still so much esteemed, and commands so high a price in the market. I have at length succeeded in obtaining authentic specimens from the place of growth, which will, I trust, tend towards a settlement of the question, although still leaving something to be desired, and to be ascertained by future researches.

Dr. Weddell points out the native locality of this species of Cinchona in his *Voyage dans le Nord de la Bolivie*, published at Paris in 1853. Touching at the Port of Guayaquil, he says :*—

"One of the barks produced by the forests of this region is the *true red bark*, which rivals the best Bolivian bark in the quantity of alkaloids which it contains. The tree which produces this precious bark, and of which I recovered the lost traces in my previous passage by Guayaquil, grows on the western slope of the Assuay, and of Chimborazo, between Chillanes and Guaranda. These geographical data will perhaps assist in deciding the botanical species to which it ought to be ascribed."

It is exactly from this district, and in the region in which, according to Laubert,† "red bark" was first discovered, that I have obtained a specimen tree which I now describe, and of which I received a few weeks since, contained in two chests, the following portions: viz., two pieces of the trunk, three of the large roots, five of the thickest branches, and one small box containing small boughs and leaves placed between paper. The leaves, though injured by imperfect drying, are still sufficiently characteristic of the species. The collector apologized for not sending the flowers or fruit because the time of year was not favorable. The tree was cut in September, 1855. The account sent was as follows: after enumerating the parts above described, he says:

"All from the same tree of red bark (*cascarilla roja*), cut in 2° 16' south latitude and 16' longitude west of the meridian of Quito, from a

*Page 48.

† "It grows, as we have stated, in the mountains of Riobamba, Cuenca, and Jaen, on very elevated spots, cool at night, and well exposed to the sun, as do all other fine species."—*Laubert's Memoir*, &c.

mountain called Chahuarpata, near the village of Cibambe, in the province of Alausi, which is one of the spots which produces the best red bark. There are not now large trees to be found, but only a little larger or less than the one sent, which is of middling size. Each piece has attached to it a paper, showing the part of the tree to which it belongs."

The trunk of the tree at the lowest part, from which the roots have been cut away, is not more than between two and three feet in circumference, and the branches are from about fourteen to eighteen inches of similar measure. The roots are of proportionate size. The thickness of the bark on branches of four and a-half inches across is not more than one-tenth of an inch. The weight of the bark is about one-twentieth that of the wood. The very large and fine red bark which we sometimes see, and which commands a price of seven or eight shillings per pound, must therefore be procured from trees of great age and size, and these no doubt fall quickly under the axe of the *cascarillero*, thus accounting for the scarcity of the finest samples. The age of the tree has also probably some influence in producing the light spongy texture of those specimens which have the highest color—the coloring matter amounting in some cases to about one-third the weight of the bark.* The bark varies much in different parts of the tree. That on the trunk, and even on the large roots, presents the familiar aspects of commercial red bark with the peculiar brick-red appearance, where the warty excrescences are rubbed and chafed. Near the roots the bark becomes thicker and more corky.

The small branches present the silvery epidermis which we meet with in the small quills. That on the larger branches resembles exactly stouter quills of red bark, and where the outer coat has exfoliated, the derm shows the small pock marks or indentation, which are characteristic of the best commercial

* It must be an important question for the physician to decide, whether this large percentage of vegetable matter, of complex chemical constitution, produces a good or bad result, when received into the stomach of the patient. I am not aware that we have any reliable information as to the medicinal effect of kinovic and cincho-tannic acids. I find the heart-wood of the tree to be rich in kinovic and less so in cincho-tannic acids, forming together rather more than two per cent. of the weight of the wood. The leaves contain a large quantity of chlorophyll, affording an alcoholic solution of a beautiful dark green color, rich purple by reflected light.



Tree producing Red Cinchona Bark.

quality,* to which indeed the tree evidently belongs; and as I have the pleasure of presenting specimens to the Museum of the Pharmaceutical Society, I need not further describe it in this place, except to say that the different portions of the trunk and branches exhibit the variety of coating usually seen in commercial red bark of genuine quality, thus showing that it all proceeds from one tree.

The varying size and form of the leaves may be inferred from the accompanying woodcut. The largest in my possession, a little imperfect at the apex, measured about nine inches in length by six in width. The shape of the leaves is that of *Cinchona ovata*, approaching perhaps more nearly to the variety *α vulgaris* than to the var. *γ rufinervis*, in which latter the leaf appears to be somewhat longer in proportion to its width. The red bark leaves, however, instead of being "*subcoriaceous*" (as in the *α* variety, illustrated by specimens given me by Dr. Weddell), are "*submembranaceous*," thus confirming its connexion with the variety *γ erythroderma*, the bark of which agrees very closely with the sort under consideration.

Of this variety, Dr. Weddell says:†

"No *Cinchona* (unless it be *C. condaminea*) is so susceptible of variation through soil and climate as *C. ovata*. It is particularly in the bark that these changes become manifest. * * A single individual of *C. ovata* frequently produces distinct varieties of bark on different sides of the trunk. The periderm is generally (in this species) much thinner on the eastern than on the western side. * * The variations which are to be noticed in the young bark of different individuals are still more striking, particularly in the periderm. * * I at one time thought that the 'true red bark' ought also to be attributed to *Cinchona ovata*, but, in looking at the specimens which M. Guibourt has shown me, I have been obliged to suspend my judgment. The barks on which I have founded this opinion were gathered in the valleys north of Cusco, and as the tree which produces them presents at the same time some differences in the leaves, I have made it into a separate variety, giving it the name *erythroderma*, which recalls its most interesting character."

* See *Pharm. Jour.*, vol. xi., p. 497. The red bark which came in the same ship, and I think from the same place, was of very good quality, and contained from three to four per cent. of alkaloids, including a fair proportion of quinine.

† *Histoire*, &c., page 62.

This seems to have been a most felicitous designation thus conferred by anticipation by this excellent botanist, who has done so much to illustrate the history of this invaluable genus. This variety will in future be, in all probability, regarded as affording the *true red bark of commerce*, of which it is well known there is but one sort which passes current and obtains a high price, whilst other samples (however red in appearance), which proceed from *C. micrantha*, var. *rotundifolia*,* or from *C. scrobiculata*,* or *C. pubescens*, or even from a variety of *C. lancifolia*, are not at all received as "red bark," but are regarded as "spurious," and the price is low in proportion.

I cannot, therefore, coincide with M. Guibourt in the opinion which Dr. W. appears at one time to have derived from him, that commercial red bark is the produce of a variety of trees. On the other hand, I am glad to agree fully with the opinion of this able professor, as given in his *Histoire Naturelle des Drogues Simples*, that the *Quinquina rouge vrai non verruqueux* (viz., that of the branches), and the *quinquina rouge verruqueux* (that of the trunk and roots), constitute together the true red bark of commerce.

M. Guibourt adds (and I think his observations are very important, as determining the next question which presents itself to our view):—

"I have shown before how this bark has been, according to false indications of Mutis, attributed to the *Cinchona oblongifolia*. This error was only discovered when Humboldt had brought into Europe the pretended 'red bark' of Mutis, or the bark of *Cinchona oblongifolia*. The error was first discovered in Germany by Schrader and De Bergen, who found that the red bark of Mutis, or the bark of *C. oblongifolia*, was that which bore in Europe the name of *Quinquina nova*. To the irresistible proofs which these two authors have given I will add—1. That the red bark of Mutis deposited by Humboldt in the Museum of Natural History at Paris, is nothing else but *Quinquina nova*. 2nd. That three samples examined by Vauquelin under the following denominations: No. 2, *Quinquina de Santa Fé*; No. 10, *Cinchona magnifolia*; No. 16, *Quinquina rouge de Santa Fé*; were *Quinquina nova*, shown to be such by the characters of the bark and by the chemical qualities of the macerating liquors. Thus nothing is better proved than this fact, that the *Cinchona oblongifolia* or *magnifolia* produces the *Quinquina nova* and not the true red bark."

* These two sorts illustrated by samples gathered by Dr. Weddell.

It must therefore be fully admitted that *Cinchona oblongifolia* (*Cascarilla magnifolia*, Weddell) is not the source of commercial red bark, but only of the worthless *Quina nova*, a bark which has been sold at an extremely low price to the tanners, though I never heard that they profited by the bargain. However frequently this name may be repeated by the old Pharmacopœias, no druggist who regards his character would venture to sell the bark of *Cinchona oblongifolia* of Mutis as having any value in medicine.

It is true that Messrs. Delondre and Bouchardat, in their recently published *Quinologie*, have given forth as their opinion that the "red bark of Mutis" was none other than what is usually considered to be the red variety of the *lancifolia*-bark of New Grenada. It is not improbable that these might enter into the composition of the immense cuttings of coarse red barks ("cortezones roxos"), which it appears* that Mutis sent over to Spain, since it was doubtless then, as now, too frequently the practice to cut any tree that resembled that which they were seeking,† and to intermingle the products; but this does not disprove the testimony, which appears to me conclusive, that the *Cinchona oblongifolia* of Mutis (furnishing the *Quina nova*, which I have described in a previous volume‡) was that on which this botanist relied upon to compete with the genuine red bark of Quito. He was determined that New Grenada should supply its red bark, and since the country did not furnish the article, he fixed upon a sort which externally bore some resemblance, and made a powder of a similar color, and to which it is but just to Mutis to say, that he only ascribes an† "indirectly febrifugal" power.

I think that I have thus sufficiently shown that the old vener-

* See *Pharm. Journal*, vol. xii., page 340.

† "Se substituen en su lugar las cortezas del arbol que se encuentran mas parecido."—*Suplemento de la Quinologia*, page 36.

‡ See *Pharm. Journal*, vol. xii., page 340.

† I extract from the *Suplemento de la Quinologia*, page 109, the following information from the pen of Dr. Mutis, which is stated to be the only botanical description of the barks of New Grenada which he published. As the authority of Dr. Mutis has been very prevalent, it is well to give the quotation in its original language and form, that it may lose nothing of its importance by trans-

able name of *Cinchona oblongifolia* may be safely disposed of. In the next place, in order to give some greater certainty in this attempted identification with the new term, I must mention that I wrote to Dr. Weddell, and also transmitted to him some of the leaves. He says (under date August 2nd) in reference to "Quinology:" "You have evidently solved one of its most interesting desiderata," and (under date August 12th, having received the leaves) he adds, "the leaves I find in a better state of preservation than I might have expected from your account. They undoubtedly appear to correspond exactly to what you infer as to their botanical origin."

I have thus given all that it is in my power to afford at present for the direct elucidation of this question. It remains that I add one or two indirect but confirmatory notices. First, as to the *Cinchona colorada de Huaranda* proceeding from a species called by Pavon *Cinchona succirubra*, and which I have described in vol. xi., p. 497 of this Journal as commercial red bark. In the course of last year I found, at Kew, Ruiz and Pavon's a botanical specimen of this, and it proves to be also a *Cinchona ovata*, akin in the sub-membranaceous character of the leaves to those which I have since received direct.

lation: "The following is the statement of the number and properties of the officinal barks inserted by Dr. Mutis in the periodicals of Santa Fé:

EN LA BOTANICA—*Cinchona*.

Lancifolia .	Oblongifolia	Cordifolia	Ovalifolia
<i>Quina</i> .			
Hoja de lanza	Hoja oblonga	Hoja de corazon	Hoja oval

EN EL COMERCIO.

Naranjada primitiva	Roxa sucedanea	Amarilla substituida	Blanca forasters
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EN LA MEDICINA: *Amargo*.

Aromatico	Austero	Paro	Acerbo
Balsamica	Astringente	Acibarada	Xabonosa
Antipyretica	Antiseptica	Cathartica	Rhyptica
Antidoto	Polycresta	Ephractica	Prophylactica
Nervina	Muscular	Humoral	Visceral
<i>Febrifuga</i>	<i>Indirectamente febrifugas.</i> "		

This enumeration of qualities for the bark of the oblongifolia clearly points to the *Quina nova*, as his recognized red bark.

The bark of the lancifolia is alone admitted to be directly a febrifuge.

That of the ovalifolia can only act through the kinovic acid it contains. Is this inert, or has it any action on the human system?

In reference to this specimen, Dr. Weddell remarks in the *Bulletin de la Society Botanique de France*, tome ii., p. 438:—

"It seems to me now demonstrated that the tree to which I applied in my *Histoire des Quinquinas* the name which I have mentioned, is really that which produces the officinal red bark. My hypothesis is confirmed by an interesting discovery made quite recently by Mr. Howard, in the herbarium of Sir W. Hooker. It is that of a flowering specimen of *Cinchona*, bearing in the handwriting of Pavon the provincial name which is now generally known to be that of 'red bark,' *Cascarilla colorada de Huaranda*.

"Mr. Howard having obligingly communicated to me the figure which he had caused to be drawn of this specimen, I had no difficulty in seeing in it the image of my *C. erythroderma*. It is true that the differences* which I mentioned between the bark of my tree and that which is commonly met with in commerce exist still as before, but I have found intermediate forms which so perfectly connect these two types, that there no longer exists in my mind any doubt concerning their identity.

"There may be a doubt, on the contrary, as to the rank which should be attributed to the plant which produces them. Should it still be attached to *Cinchona ovata* as a variety, or should it be raised to the rank of a species? It is a point which can scarcely be finally decided till we know its fruits. Whatever it may be, the discovery made by our colleague Mr. Howard, of a flowering branch of the *Q. de Huaranda*, has certainly made a great step towards the solution of the problem, and has appeared to me worthy the attention of the Society."

I may add, in reference to the piece of the bark of *C. erythroderma* (*C. ovata* var. γ *erythroderma*) given me by Dr. Weddell, that it agrees in minute particulars with that of commercial red bark. The color of the denuded derm, the indentations upon this, and the impression of the cross crack, forming a ring at distant intervals, also the character of the periderm,—all these correspond; but the color is not fully equal to the *finest* red bark, and it is perhaps rather more dense and woody; but even the bark of the branch and trunk of the same tree vary in these particulars.

The Huaranda bark in the British Museum, which both M. Guibourt and myself regard as genuine "red bark," has also peculiarities such as might mark a tree grown in less favorable soil. The leaves and small branches of my red bark tree give the impression of luxuriant vegetation. That of Pavon's speci-

* "The texture of my bark is more woody than that of the typical red bark."

men, on the contrary, tells of rather stunted growth. But such variations must be expected in a tree growing in localities so distant from one another.

The last particular which appears to me confirmatory of the correctness of this botanical derivation, is the very close analogy which exists between the "red bark" and that which is called in commerce "*Carabaya bark*," and which, according to Dr. Weddell, also proceeds from a variety of *C. ovata*. This struck long ago, and would occur to any person who will take the trouble to compare the two sorts; but it is not a matter susceptible of demonstration, and I will not dwell upon it.

It is to be hoped that the remaining links of this chain of investigation will shortly be added, through our being put into possession of the flowers and fruit, as well as a further supply of the leaves of this interesting tree; and that these will afford materials for completely determining whether it coincides with Dr. Weddell's *Cinchona ovata*, var. γ *erythroderma*; and whether, if such be the case, that plant ought to be raised to the rank of a species.—*London Pharm. Journal*, Oct. 1, 1856.

ON PHASEOMANNITE, A NEW KIND OF SUGAR, CONTAINED
IN THE UNRIPE FRUIT OF THE KIDNEY BEAN (*PHASEOLUS
VULGARIS*).

By H. VOHL.

The author observed that the juice of the unripe fruit of the kidney bean possessed a very sweet taste, and that after complete fermentation and the distillation of the alcohol formed, the residue had lost none of its sweetness. He attributed this to the presence of mannite.

To prepare mannite from the beans, these were finely cut up, put into a press-bag, exposed for half an hour to hot steam or plunged into boiling water, and then strongly pressed. The brown fluid was mixed with yeast, fermented, and after fermentation neutralized with chalk or carbonate of soda. The fermenting fluid presented the odor of preserved beans.

The fluid produced was evaporated on the water-bath to the consistence of a syrup, and the extract-like mass exhausted with alcohol of specific gravity 0.863. The alcohol was distilled off,

and the residue somewhat reduced in the water-bath, and left for twenty-four hours, when a quantity of flat needles, concentrically grouped, which might be taken for mannite, crystallized from it.

The crystals were freed from the mother-liquor, pressed between bibulous paper, and dissolved in weak alcohol. A small quantity of gum and vegetable gelatine separated, and were got rid of by filtration. When the alcohol had been distilled off, and the aqueous solution decolorized by animal charcoal, it furnished, by spontaneous evaporation, beautiful limpid prisms, partly grouped concentrically, very different in their external appearance from mannite. This body, which possesses a sweet taste, is readily soluble in water and dilute alcohol, but difficult of solution or insoluble in absolute alcohol and ether.

It loses water of crystallization in dry air, becomes dull, and more difficult of solution in water, from which, however, it separates on spontaneous evaporation with its original amount of water. At 212° F. it loses 16.5 per cent. of water.

When heated, the crystals decrepitate and give off water; between 302° and 320° F. they fuse to a colorless liquid, which solidifies in a crystalline form on cooling; when heated to 454° – 472° F., the body begins to boil, with evolution of empyreumatic vapors, which diffuse an odor of burnt sugar. The vapor burns with a luminous flame, without smoking. The carbonaceous residue burns upon platinum without leaving an ash. When mixed with soda-lime and heated, the substance evolves no ammonia.

With a solution of sulphate of copper and potash, it gives a dark azure-blue solution, which does not deposit protoxide of copper either in the cold or by boiling.

The behaviour of this body with sulphate of copper and potash, and its incapability of fermentation, place it in the same series with mannite; but its behaviour in dry air and its composition give sufficient cause to distinguish it strictly therefrom. The author therefore calls it *phaseomannite*.

The combustion of the body, dried at 212° F. with chromate of lead, gave on the average of three analyses—

C	41.0475
H	6.8649
O	52.0876

From this the formula of the body dried at 212° F. is calculated as $C^{21} H^{21} O^{20}$. This formula requires—

C 41.042

H 6.840

O 52.118

Phaseomannite dissolves in cold concentrated sulphuric acid without blackening. The solution only becomes brown when heated to 212° F., deposits carbon, and evolves sulphurous acid. In cold concentrated nitric acid it dissolves without acquisition of color or evolution of gas; on the addition of English sulphuric acid, a body separates in white flakes. In all probability this is the nitro-compound of phaseomannite.

Boiled with dilute sulphuric acid, it appears to undergo no alteration, and afterwards produces no protoxide of copper on the addition of sulphate of copper and potash. When heated with nitric acid, it forms oxalic acid.

Phaseomannite has a pretty strong gurgling action, which explains the production of looseness in the bowels by the use of beans.

The author observed that the beans contained this body in the greatest abundance when the seeds were still small, and that the phaseomannite disappeared as starch was formed.—*Chem. Gaz.* from *Liebig's Annalen*, July, 1856.

NOTE ON THE PRECIPITATION OF VARIOUS SALTS FROM THEIR SOLUTIONS.

By F. MARGUERITTE.

When muriatic acid is mixed with a solution of chloride of sodium, the latter is immediately, if not completely precipitated. But if a current of muriatic acid gas is passed until rejection into a solution of common salt, the latter is precipitated within a few thousandths, and the liquid muriatic acid left in the fluid is in such a state of purity that it may be sold.

With a mixed solution of the chlorides of sodium and potassium, the chloride of sodium is first precipitated, so that by dividing the operation the separation of these two salts may be effected in a certain degree. The insolubility of the chlorides of sodium and potassium in muriatic acid is so great, that under its influence

the sulphates of soda and potash are decomposed into insoluble chlorides, and free sulphuric acid eliminated in the liquid. This decomposition may go very far; thus muriatic acid gas, when passed until rejection into a solution of sulphate of potash, converts nearly 70 per cent. of the latter into chloride of potassium, setting free a corresponding amount of sulphuric acid.

The double sulphate of potash and magnesia undergoes a similar decomposition. Sulphate of magnesia does not participate in this reaction, and, like the chloride of magnesium, it is not precipitated by muriatic acid unless under particular conditions of concentration.

Sulphate of soda, under the same circumstances, is decomposed in a more complete manner, in consequence of the greater insolubility of chloride of sodium in muriatic acid. The precipitation of the chlorides of sodium and potassium in this way appears capable of industrial application—

1. In the preparation of a quality of salt for special purposes;
2. In the production of crude salt; and
3. In the separation of chloride of potassium from the mother-liquors of salt marshes.

The peculiar state of the salt precipitated by muriatic acid, its extreme division, its whiteness and brilliancy, its perfect purity, and the simplicity of its preparation, render it preferable for the purposes of luxury to every kind of salt, whether obtained by trituration or by evaporation with heat. It is obtained perfectly pure by operating upon common salt-water, and still better with a solution of common salt. The acid liquid is decanted, and the precipitate dried upon the sole of a furnace heated in a suitable manner, by which the salt is purified from the muriatic acid with which it is impregnated. Before drying the precipitate, it may be washed with the salt solution, which is afterwards to be submitted to precipitation. This washing removes nearly the whole of the muriatic acid. Lastly, the excess of acid may be saturated with carbonate of soda, the cost of which would not be greater than that of heating the drying furnace, and this would allow it to be spread out, and dried in the open air.

The passage of the gas keeping the liquid in a state of continual agitation causes the precipitation of the salt in extremely fine grains; but it may be obtained in large crystals when the

muriatic acid is allowed to dissolve at the surface of a liquid in repose, as is usually done in the condensation of this acid.

The separation of chloride of potassium from the mother-liquors of salt marshes is more rapid, more complete, and cheaper than the process now employed, which consists in concentrating the mother-liquors by heat, and leaving them to crystallize under conditions of temperature which are not always to be obtained with certainty. Moreover, the product obtained is a triple chloride of sodium, potassium, and magnesium, a compound which must be purified by successive crystallizations, causing a loss of time, fuel, and material. By the action of muriatic acid upon the mother-liquors, nearly the whole of the chlorides of sodium and potassium contained in them is obtained; the chloride of magnesium remains in the solution, which may be employed in the manufacture of chloride of lime. The chlorides of sodium and potassium are separated without difficulty, either by dividing the precipitation, or by their different degrees of solubility when hot and cold.

The advantages of this process in the production of crude salt do not appear to be doubtful. About salt-works there are generally manufactories of sulphate of soda, which are a constant source of muriatic acid. The whole of this acid is not collected in some places, its sale being difficult from the cost of transport. Supposing that all the muriatic acid produced would be sold, 100 kilogrms. of salt converted into sulphate of soda would reproduce rather more than 33 per cent. of their weight in common salt. If it were found more advantageous to apply all the muriatic acid in precipitation, a much larger quantity of salt would be regenerated in this manner. 100 kilogrms. of chloride of sodium, decomposed by sulphuric acid, give 62.39 kilogrms. of muriatic acid, which require 109.1 kilogrms. of water to furnish a solution of the density of the muriatic acid of commerce (1.18). This quantity of water at the ordinary temperature would dissolve, and consequently allow of the precipitation of 38.18 kilogrms. of salt.

The solution of muriatic acid, if it be not sold, will give when gently heated 43.2 kilogrms. of gas, which precipitate 26.45 kilogrms. more salt; and the solution, when deprived of all the gas which it is capable of giving off, will represent acid with 16

equivs. of water, which is still serviceable for some purposes. In these two operations the quantity of salt precipitated will be 64-65 kilogrms. This is theoretical; but if we consider the quantity of salt reproduced as 50 per cent. only, this valuation will not appear exaggerated when we consider the efficacy of the means and the simplicity of the operation.

The principle of this operation consists in the employment of a volatile agent, which, after serving to precipitate the salt, may be driven off by heat, without leaving any impurity behind it. Upon the same principle several other salts may be eliminated from their solutions, although in a less complete manner. Carbonate of soda may be precipitated in a state of great purity by ammonia from a solution of common soda; the crystalline salt obtained, when dried upon a stove, does not retain the smallest trace of ammonia. Moreover, the same quantity of ammonia will serve almost for an indefinite period, as it is sufficient to heat the ammoniacal liquid to recover all the gas which it had dissolved. Ferrocyanide of potassium, and some other salts, are also precipitated by ammonia.—*Chemical Gazette*, Sept., 1856, from *Comptes Rendus*, July, 1856.

ON SOME NEW PROPERTIES OF FRESHLY CALCINED WOOD CHARCOAL.

By M. MORIDE.

The deoxidising power of wood charcoal is well known, when used in the dry state and under the influence of an elevated temperature; but I do not know that any one has mentioned it as reducing metals in the midst of neutral, alkaline, or acid liquors, neither am I aware that any one has observed that in contact with a dilute and alcoholised acid, freshly calcined wood charcoal caused the formation of ether. I am continuing this study, but I have determined to make known the results of my first experiments.

Coke, charcoal from lignites, animal and bone charcoal, do not produce the effects of which I am about to speak.

1st. When incandescent wood charcoal is plunged directly, or after being extinguished with cold water, into an acid solution of sulphate of copper, the metal is gradually deposited upon the

charcoal until it may be entirely recovered. In neutral or alkaline liquors the reaction is not so well performed. In Barreswill's liquor, for instance, the copper deposited upon the charcoal has a very beautiful iridescent appearance. When nitric acid, hydrochloric acid, or sulphuric acid is used to acidify the solutions, the effect is the same, only that it is clearest with sulphuric acid.

2nd. I have observed that the metallic salts of organic acids are less easily decomposed than those which contain mineral acids.

3rd. The solutions of silver in nitric acid, whether neutral or acid, and chloride of silver dissolved in ammonia, are easily decomposed by freshly calcined wood charcoal. The silver is soon seen to cover the charcoal in the most beautiful manner; it sometimes appears crystallized.

4th. Copper may, by this same means, be precipitated from ammoniacal solutions; but if these solutions likewise contain silver, the latter will be first reduced.

5th. Finally, incandescent wood charcoal plunged in Fowler's solution, acidified with sulphuric acid, produces a very agreeable ether which I intend to examine. It will be easy to make in this way, by varying the acids, nitric, acetic, sulphuric ethers, &c.

6th. Zinc, iron, platinum, lead, and mercury may be precipitated by wood charcoal, but they re-dissolve in acid liquors; this does not occur at all with silver, and with copper not until twenty-four hours after the operation.—*Chemist, from Comptes Rendus, Oct., 1856.*

CARYOPHYLLIC ACID.

By L. CHIOZZA.

Calvi has repeatedly analysed the caryophyllic acid procured from oil of cloves, in order to test the admissibility of the formula established for it by Gerhardt. The previous analyses made by Dumas, Ettling, and Bäckmann gave more carbon than is required according to the formula proposed by Gerhardt. The

numbers obtained by Calvi in his analyses differ very little from those required by this formula. The acid employed for analysis was purified by dissolving the crude acid in caustic potash, and boiling the solution until the complete removal of the hydrocarbon which accompanies caryophyllic acid in oil of cloves. The analyses gave—

	Found.					Calculated $C^{20}H^{12}O^4$.
	I.	II.	III.	IV.	V.	
C	72.7	72.4	72.7	72.7	72.6	73.1
H	7.0	7.0	7.0	7.3	7.3	7.4

The equivalent weight of caryophyllic acid cannot be deduced from the density of its vapor, because this acid is altered at a high temperature. Calvi, in several experiments, obtained the same result as Dumas, who gives the density of the vapor of this acid = 6.4. The density of vapor calculated from the formula would be 5.66.

The analysis of the baryta-salt gave an amount of baryta which would correspond with the formula $C^{20}H^{12}O^4$; but the analyses of other salts gave variable and contradictory results, as there is great difficulty in preparing these salts in a truly neutral state. Thus the potash-salt always loses a certain quantity of acid during evaporation.

The other experiments made by Calvi confirm the results already obtained by other chemists. The only interesting fact which he ascertained in the investigation of the decomposition of caryophyllic acid is its conversion into a neutral oil by distillation over anhydrous baryta. The product thus obtained is no longer attacked by solution of potash, and has quite different properties from caryophyllic acid, although (if we may conclude from the results of one analysis) it has the same composition and the same density of vapor.—*Chem. Gaz.*, Nov. 1, from *Liebig's Annalen*.

ON EFFERVESCING POWDERS.

By JNO. M. MAISCH, of Philadelphia.

Effervescing powders are used on account of the carbonic acid in gaseous state which is generated as soon as they are thrown into water to dissolve. The carbonic acid is highly esteemed for its agreeable refrigerance, or it is employed to mask to a certain extent the taste of other medicines. The generation of carbonic acid is effected by the mutual decomposition of a carbonate with a vegetable acid or an acid salt. Of the carbonates used, the preference is usually given to the bicarbonate of potassa or soda, seldom only the officinal carbonate of magnesia or monocarbonate of soda are employed; carbonate of potassa is entirely unfit to enter into such a combination, owing to its deliquescence.

Among the acids, recourse is had to the tartaric and citric, they being the only two officinal acids suitable for such a preparation; sometimes they are replaced by bitartrate of potassa, the object of which is to have the evolution of carbonic acid going on in the stomach.

In the United States and England, the carbonate and the acid are usually kept in two separate papers, distinguished by their blue and white color, while on the continent of Europe, for its greater convenience, a mixture of the two is habitually employed and is even officinal in most of the continental Pharmacopœias.

The U. S. Pharmacopœia has no officinal formula for any of these powders; however it is customary for the apothecary to prepare two different kinds, one under the name of "*soda powders*" which shall contain for one dose 30 grains of bicarbonate of soda in a blue paper, and 25 grains of tartaric acid in a white one. The "*Seidlitz powders*," intended for a slight laxative, require 2 drachms of tartrate of soda and potassa with 10 grains of bicarbonate of soda in a blue, and 30 grains of tartaric acid in a white paper. These powders became officinal in the Prussian Pharmacopœia under the name of English effervescing powders, (*Pulvis aërophorus Anglicus*) and are put up in the greatest part of Europe in accordance with this formula. It has been proposed by Dr. Mohr to substitute tartrate of soda for Rochelle salt,

from which tartaric acid precipitates cream of tartar. Sometimes, especially in France, where such formula have originated and were published, the Rochelle salt is partly or wholly replaced by sulphate of soda, and sulphate of magnesia, and the powders thus prepared indiscriminately sold under the name of "poudre de Sedlitz," from which they chiefly differ by their bitter taste, the aperient properties being about alike. If these powders are put up in an air-dry state, they keep admirably well for any length of time. Of the British Pharmacopœias, the Edinburgh and Dublin give directions for similar preparations under the name of *pulveres effervescentes*, for which either bicarbonate of soda or potassa may be used. The Dublin Pharmacopœia also directs *pulveres effervescentes citrati*, which are made of citric, instead of tartaric acid. Under the name of simple effervescing or Seltzer powder, Dorvault directs 4 grammes (61.7 grs.) of bicarbonate of soda in a blue, and the same quantity of tartaric acid in a white paper, which, when dissolved in a wine bottle full of water containing $1\frac{1}{2}$ or 2 oz. of syrup of currants or lemon, form a very refreshing drink. There are many similar formulæ for "effervescing lemonade," usually consisting of bicarbonate of soda, which for its cheapness is preferred to the potassa salt, mixed, with a certain quantity of sugar, flavored with oil of lemon in one paper, and of tartaric or citric acid done up in another one. The chief object in making such powders is to obtain their refrigerant qualities, and the acid is therefore taken somewhat in excess to assure of the entire decomposition of the carbonate and to procure a quantity of an acid salt, either bitartrate or bicitrate, which by its agreeable acidulous taste adds much to the pleasant and refreshing properties. Sometimes, however, the physician desires an antacid effect at the same time with the refrigerant action of the carbonic acid, and increases the quantity of the alkaline carbonate sometimes far beyond the power of saturation of the acid employed.

An effervescing powder is also occasionally made, consisting of bicarbonate of ammonia, and of citric acid, and thus forms a pleasant substitute for the solution of citrate of ammonia of the London College, in as much as with each dose beside the ammonia, a corresponding quantity of carbonic acid is administered

20 grains of the crystallized citric acid will saturate 18 grains of the bicarbonate of ammonia, the quantity of which, however, may be enlarged if a more decided action of the ammonia is wanted.

Sometimes, though as yet not very often, if Seidlitz powders are excepted, effervescing powders are used to cover the unpleasant taste of some medicines; in this view they are mostly used in connection with Rochelle, Epsom, and Glauber's salt, the bitterness of which salts is to a certain degree masked, particularly if taken in connection with lemon syrup. Meirieu has proposed to administer sulphate of quinine in this manner, by mixing 1 decigramme of it (1.5 grains) with 1 gramme of tartaric acid, and in another paper 1.2 grammes of bicarbonate of soda and 8 grammes sugar; the quantity of the acid just suffices to convert the soda into the neutral tartrate, and to render the quinine easily soluble, which is intended to be taken with its bitterness masked by the sugar and the evolved carbonic acid. A ferruginous effervescing powder has been proposed by Colombat, and the formula for it published by Dervault. The powders are made by mixing 2 grms. (grs. 30.87) sulphate of iron, 6 grms. (grs. 92.60) tartaric acid, and 12 grms. (3 drachms) sugar, and dividing the mixture into 12 powders, which are done up in white paper; each of the blue papers contains 5 grs. of bicarbonate of soda and 15 grs. of sugar. A reaction at first takes place between the iron and soda salt, resulting in some sulphate of soda and bicarbonate of the protoxide of iron, which is decomposed together with the rest of the bicarbonate of soda by the tartaric acid; the acid is just within the fraction of not quite 2 grains for the 12 powders, sufficient to produce tartrate of the protoxide of iron and bitartrate of soda. If the assertion of many practitioners be correct, that iron exhibits the most useful and reliable action in the animal body when administered in the state of protoxide, the above prescription might perhaps be found very beneficial and claim the attention of physicians. Tartrate of protoxide of iron is but little soluble in water, and it might perhaps be thought objectionable on that account; it remains to be seen, however, whether bitartrate of soda or the carbonic acid does not act as a solvent, or whether the digestive liquids do not easily decompose it, so as to assimilate the iron.

If the pure sulphate of the protoxide is mixed with tartaric acid, the mixture keeps admirably well, so far at least as may be judged from the color, and in making such an effervescing draught, the iron will consequently reach the stomach before it can be oxidized to sesquioxide by the influence of the atmosphere.

In the preceding I have taken a cursory view of the various kinds of those effervescing powders, which are put up with the acid and the carbonate in different parcels, and will now proceed to the principal object of this paper, that of drawing attention to that very convenient form of the same kind of powders, which differ from the former in containing all the materials necessary for the evolution of carbonic acid gas mixed into one uniform powder. Of these effervescing powders, Wood and Bache's Dispensatory has on page 54 the following short notice: "Tartaric acid, dried by a gentle heat and then mixed in due proportion with bicarbonate of soda, forms a good effervescing powder, a teaspoonful of which, stirred into a tumbler of water forms the dose. The mixture must be kept in well stopped vials." Every body who has been making such powders, will have experienced that such a mixture, no matter how closely stopped it may be kept, will spoil and even become moist. Professor Otto has made some experiments and discovered some interesting facts with regard to this phenomenon, an account of which he has published in the *Annalen der Chemie und Pharmacie*, xvii, 378, of which I will give a short abstract. A mixture of equal parts of bicarbonate of soda and tartaric acid becomes moist when introduced into well stopped vials, and this change takes place the quicker, the better the air is excluded; it keeps better if the vials are simply covered with paper; but if the powder is kept in ordinary paper boxes, he has never seen it to spoil. Experiments of Bosse have shown that such a mixture loses weight from the expulsion of carbonic acid, which loss is greater, the better the powder is secured from contact with the air. This decomposition is introduced by a portion of moisture which the mixture contains, and which must evaporate on the air, to keep the powder unaltered. But if both ingredients are dried before mixing at a temperature between 120 and 145° F.

the tartaric acid loses nothing, but the bicarbonate of soda 11 per cent.; if the mixture is now made and introduced into a well stopped vial, it has commenced to decompose after the lapse of 24 hours and the decomposition progresses rapidly. But if the soda salt was dried at 167° F. (60° R.) the mixture was unaltered after having been kept 12 days in a closed vial. It is the water of combination, and not hygroscopic water that introduces the change, though damp favors it; this water is set free at the formation of tartrate of soda, and causes the moisture and liquefaction; it must be allowed to evaporate; that takes place easily from the fine powder at the tension of a low temperature, and for this reason the alteration is so little that it is without any consequence. Such a mixture which has been in contact with the air for some time and is still unaltered, commences to change as soon as it is introduced into a stopped vial. If the powder is directed to be kept in a vial, it might be more advisable not to dry the ingredients, but the finely powdered mixture. In no case, however, not even with the greatest care could the powder be kept for many years.

These remarks apply next to the effervescing powder of the Prussian Pharmacopœia, with which the experiments were made; it is prepared of 4 parts of bicarbonate of soda, 3 parts of tartaric acid, and 7 parts of white sugar. Immediately on throwing this powder into water, effervescence takes place violently. Other preparations, however, generate the carbonic acid slowly, even so slow, that the greater part of the reaction takes place in the stomach. By this means quite a quantity of carbonic acid can be introduced into the stomach at a single dose, and is there mostly generated by degrees. Vogler gives the following formula: Exsiccated carbonate of soda $\mathfrak{z}\text{ij}$, bicarbonate of potassa $\mathfrak{z}\text{ij}$, sugar $\mathfrak{z}\text{ss}$. If three drachms of bicarbonate of soda are substituted in this formula for the exsiccated soda, a larger amount of carbonic acid will be evolved. But as bitartrate of soda is a heavy salt and only slightly soluble in cold water, the idea suggests itself of looking for a comparatively more soluble salt, to take the place of the former in such a combination. Such a salt we find in the bitartrate of soda, which is much easier soluble in water than cream of tartar, but does not act so violently on the carbonate as the free acid, especially not if cold

water is used for the menstruum. Bicarbonate and bitartrate of soda must be used in the proportion of 9-20 to furnish a neutral salt. If the ingredients are pulverized separately and afterwards mixed with finely powdered sugar, the mixture will keep very well in a paper box, with no other precaution except to keep it away from dampness.

In a similar manner effervescing powders may be prepared with bicarbonate of ammonia, of which 14 parts are necessary to completely saturate 15 parts of tartaric acid, so as to form the neutral tartrate of ammonia, or 30 parts of the acid are required if the formation of bitartrate of ammonia is desired. 7 parts of bicarbonate of ammonia will saturate $18\frac{1}{2}$ parts of bitartrate of potassa, and 3 parts of the carbonate, $8\frac{1}{4}$ parts of bitartrate of soda, in the first case forming the tartrate of ammonia and potassa, in the latter tartrate of ammonia and soda. The same results may be arrived at, if bitartrate of ammonia be used, and it may suffice simply to state here the required proportions:

16 parts of it saturate 7 parts of bicarbonate of ammonia, forming neutral tartrate of ammonia.

2 parts of it saturate 1 part of bicarbonate of soda, forming tartrate of soda and ammonia.

4 parts of it saturate $2\frac{1}{2}$ parts of bicarbonate of potassa, forming tartrate of potassa and ammonia.

3 parts of it saturate 1 part of dry carbonate of soda, forming tartrate of soda and ammonia.

An effervescing powder containing magnesia was formerly more extensively used in Europe than at present; it consisted of carbonate of magnesia zij , tartaric acid zss , sugar zi , oil of lemon gtt. ij . An effective and very pleasant cathartic may be prepared from the following ingredients: carbonate of magnesia, citric acid, sugar, aa zij to ziii , oil of lemon gtt. ij . The ingredients are to be separately rubbed into a fine powder and then mixed. Thus extemporaneously prepared and soon taken, it makes a pleasant drink and is a good cathartic. The powder is to be stirred into about half a pint of water, when chemical reaction will instantly commence; when it has fairly set in, it should be taken at once. I have omitted to make experiments with regard to its keeping. It remains to be seen, and experiments ought to be made, whether it may be preserved unaltered

for some time according to the plan suggested by Professor Otto. As citric acid contains much water of crystallization (4 equiv.) it might probably in this case be advisable to first expel the same by exposure to heat, and after it has become quite cool to mix it with the other ingredients previously finely powdered. It might be of great service upon voyages in cases where saving of space is of some account, and where bottles cannot be well packed; it would combine smallness of bulk and portability, and for these reasons would be preferable to the official solution. Its great advantage over the soluble citrate of magnesia would be its cheapness and its far more refreshing taste, produced by the carbonic acid set free and the citric acid still in solution. The citric acid in the formula given may be augmented, but as the reaction does not take place at once, and as it is drank before the saturation is completed, there is no reason for doing so; the solution will still hold a sufficiency of free citric acid to cover the taste of the magnesia salt, and render the draught quite a refreshing one; the chemical reaction is completed in the stomach.

If the administration of an iron salt is intended, Colombat's formula given above may be used, and all the ingredients mixed into one powder; but it must be carried in mind that this results in a *tartrate* of the protoxide of iron. As it has always been a desideratum how to administer a carbonate of the protoxide of iron in an unaltered state, and as even Vallet's mass becomes oxidized, the following mode of administration is suggested. Sulphate of iron Ziss , tartaric acid Dijss , dry carbonate of soda Dijss , sugar gij . The chalybeate waters contain usually the carbonate of protoxide of iron, dissolved by an excess of carbonic acid, besides some alkaline salts. Physicians value these waters, because they are usually better adapted to the digestive organs and are easier assimilated, consequently of a quicker and more reliable action on the human frame than the ordinary ferruginous preparations. These properties are doubtless due to the presence of that mild acid, the carbonic and probably to the aperient salts, both of which combine their action with that of the iron. In the formula given above sufficient carbonic acid is generated to convert the iron salt into a carbonate of the protoxide, and keep the same in solution. Thrown into

a bottle filled with water, a clear solution is obtained, from which on exposure to the air sesquioxide of iron is separated. If a brisker effervescence is desired, the acid and soda may be increased in due proportion, or instead of the latter, $5\frac{1}{2}$ scruples of bicarbonate of soda substituted, when the mixture will contain double the amount of carbonic acid. A little sulphate of soda, corresponding with the quantity of iron will be formed, and the neutral tartrate of soda which does not decompose the dissolved carbonate of protoxide of iron. The quantity of these salts formed is but small, only large enough as is necessary for obtaining a sufficiency of carbonic acid; thus an opportunity is offered to combine with the powder such substances as may be thought necessary to increase its effect or direct it to a certain point; such substances of course must not interfere with the carbonate of iron. The teaspoonful of the above chalybeate effervescing powder contains about 18 grs. of sulphate, equal to $7\frac{1}{2}$ grs. of carbonate of protoxide of iron. With regard to the sulphate of iron I would here yet remark, that even not the finest crystals ought to be used for such a preparation if stability is desired. Without entering into details at present it may suffice to say, that this salt keeps best, by itself and mixed with other powders, if it has been precipitated from a concentrated solution by strong alcohol, well washed with the same, and afterwards well dried in the open air, spread out in thin layers on bibulous paper.

My investigation with reference to the administration of quinine has not been completed yet, but the few experiments made convince me that it is a very good mode to administer quinine and cinchonine in an effervescing powder, made with citric acid and sweetened with sugar, previously rubbed up with the yellow skin of fresh orange peel. This corrects the taste better than lemon, cloves, or any other aromatic that I have tried. The bitterness seems to be less perceptible, when the effervescing powder affords a nearly neutral mixture, and a sufficiency of the orange skin has been added to impart a high and agreeable flavor to the draught.

Administration of Ammonia.—Bicarbonate of ammonia is devoid of the ammoniacal smell, and, although, having still a somewhat pungent taste, may be given in almost any form, even the

powder and solution hardly requiring more than a little sweetening to render it pleasant to take. If the full effects of ammonia are quickly desired, we have no other preparation for such a purpose, but the various preparations of caustic ammonia and the officinal-sesquicarbonate. This latter one only can be made into pills, but is usually given in solution, like spiritus and aqua ammoniæ; their taste and smell, however, are so very pungent and penetrating that they cannot be covered or masked, either by aromatics or mucilages. As they are valuable remedies in scarlet fever, the small children, for whom they are prescribed, often object to taking them. We have, I believe, a much more convenient and pleasant form to secure the effects of ammonia without incurring its penetrativeness; we may arrive at this end in a somewhat similar way as above, in trying to obtain the properties of carbonate of protoxide of iron. If a solution of the neutral tartrate of ammonia is mixed with a solution of carbonate of potassa, an ammoniacal smell will soon be perceived, and a glass rod, moistened with muriatic acid, will evolve thick white vapors if held above the surface of the liquid. An interchange has taken place, a double decomposition, by which tartrate of potassa and carbonate of ammonia, has been formed.

If bitartrate of ammonia is mixed with a solution of carbonate of potassa, an effervescence will take place, and the formation of a double tartrate of the two bases; a further addition of carbonate of potassa will displace the ammonia from its combination, which, with the carbonic acid of the potassa salt and that still held back by the solution, combines to bicarbonate or sesquicarbonate of ammonia. But if, after the saturation of the bitartrate of ammonia with carbonate of potassa, the carbonic acid is expelled by a moderate heat, or if the double tartrate of potassa and ammonia be taken at once, the subsequent addition of carbonate of potassa causes the formation of monocarbonate of ammonia. Bicarbonate of potassa used in place of the carbonate, will, in all cases, cause the same result, that is, the production of bicarbonate of ammonia. Consequently, if we want the formation of monocarbonate of ammonia, we have to bring in contact neutral tartrate of ammonia, or its double salt with tartrate of potassa, and carbonate of potassa; as this latter, however, cannot be dispensed in form of powder, and as it dissolves in water

too easily, and for this reason acts too quickly on the tartrate so as to form carbonate of ammonia, it is not fit to answer the purpose of having the reaction going on in the stomach so that the powder may pass the organs of smell and taste without exhibiting anything but a salinous taste; the dry carbonate of soda then takes its place, on account of its similar action and its slower solubility; even carbonate of lime might be used in some cases; the powder should be mixed in syrup and given at once, but care should be taken not to direct an excess of carbonate of soda, which might develop its caustic properties in the stomach. Tartrate of ammonia, with which I have experimented a short time ago, I believe to be a far more stable salt than is usually supposed, but other salts such as the sulphate and muriate can be used in lieu thereof; it should, however, never be left out of sight that with these powders a double decomposition takes place, and that, for instance, a mixture of carbonate of lime and sal ammoniac would be inadmissible, on account of the formation of chloride of calcium. One part of exsiccated carbonate of soda would suffice for one and three-quarter parts of the neutral tartrate, one and a quarter of sulphate and one part of muriate of ammonia.

Whenever medicine is administered, it ought not only to be prepared nicely, but appearance and taste ought to be made as agreeable as possible, so as to please the eye, and, if possible, the palate of the invalid. Very often has the pharmacist occasion to take notice of some behavior of medicines in this regard, often he may be interested sufficiently to make some experiments for the sake of information, and thus arrive at some satisfactory results. We know sugar has been tried to mask the taste of disagreeable medicines, aromatics and spirits have been tried, but for some in vain. The effervescing powder seemed to be one means that had not been sufficiently tried yet, and a desire to find a more pleasant way for administering ammonia, has also led to the experiments with iron to discover a way to administer it in the state in which it occurs in most of the chalybeate springs. These are the reasons for having undertaken these investigations; if the result and the suggestions expressed will inspire others to a trial of pushing forward in this direction, the results might probably be very satisfactory.

From the Proceedings of the American Pharmaceutical Association.

REMARKS UPON THE MEDICINAL PLANTS OF CHEROKEE GEORGIA.

By ROBERT BATTEY, of Rome, Georgia.

While this section of Georgia was occupied by the Cherokee tribe of Indians, the collection and exportation of medicinal plants and roots, together with slugs of silver, (obtained from a source now unknown) skins and venison hams was their only means of securing the requisite supplies of salt, whiskey, gunpowder, calico, &c., consumed by them. One George Lavender, a white man, (who early attached himself to the Cherokees, and afterwards married, I believe, the daughter of John Ridge, one of their chiefs,) was the principal trader of the tribe. Establishing himself at the point now known as Rome, he carried on a considerable trade in the articles named, and is said to have had engaged in his service numbers of wagons, transporting these commodities to Augusta, a distance of two hundred and fifty miles, and returning with goods for his store. In this way he accumulated in some twenty years quite a large fortune. He sent to market chiefly pink root, serpentaria, senega and ginseng. I can obtain no definite data as to the annual amount thus sent off, or the relative quantities of each. *Spigelia* and *serpentaria* doubtless predominated largely. I am informed that he was in the habit of shipping *spigelia* with the top attached, for which he exchanged salt, powder and dry goods, allowing the Indians two cents the pound. During one season, having the monopoly of salt, he is said to have exchanged an entire sack in small lots, for slugs of native silver, weight for weight. Many marvellous tales are told of him and his traffic.

For some years prior to the removal of the Cherokees west, the supply of these plants greatly diminished, until the trade in them almost entirely ceased, and the Indians devoted themselves more to the culture of grain, which became so abundant as to be almost worthless as an article of sale. During the space which elapsed since their departure, the stock of medicinal plants has gradually accumulated in our forests, until a profitable business could again be done in them, had we the Indians among us as laborers. Our negroes cannot be depended upon for discretion and industry, while white laborers regard it as entirely too

small business to engage their attention. It is scarcely probable that a business will ever again be done here in them, until the prices shall so far advance as to cause the avarice of our population to overcome their pride.

The fertility of our mountain lands, which chiefly distinguishes this section of Georgia, peculiarly fits it for the spontaneous growth and cultivation of medicinal plants. Our climate intermediate between that of Pennsylvania and Florida, gives us many of the native plants of each, and enables us to cultivate successfully a larger variety.

Capsicum annuum grows well here, but not to the perfection of the middle and lower portions of our State.

Cassia Marilandica is found in considerable abundance, employed to some extent in domestic practice; not used by our physicians.

Chenopodium anthelminticum grows very abundantly in fence corners; old fields are often nearly covered with it; seldom found in the forest; employed in infusion as an anthelmintic under the name of Jerusalem tea. But for the expense of apparatus a good business might be done in the distillation of the oil.

Chimaphila umbellata abounds in our forests, but not to the extent it does in portions of middle Georgia. It possesses a sandier soil than ours; much use is made of it "to cleanse the blood." It is sometimes called prince's pine.

Cimicifuga racemosa is very abundant along the Chattahoochie River, as also throughout the State; used by the profession in private practice and freely by the "steamers"; known among the farmers as "rattle weed."

Fraseria Walteri is very abundant, and frequently offered to druggists under the name Columbia root; used as a substitute for colomba by the profession as well as in domestic practice.

Cornus Florida is a very common tree in our forests, of usually a small size, and is very attractive to the eye when in bloom. Dogwood bark is universally used as a tonic after fevers and intermittents.

Anthemis cotula is one of our greatest pests. May-weed, stink-weed, dog-fennel, and wild chamomile are its vulgar names. It completely covers waste lands and the commons around our cities and towns. The bruised herb is said to blister as promptly

as cantharides. It is little if at all used here. The infusion gives rise to abortion in females. During the hot summer months it exhales a very offensive odor.

Eupatorium perfoliatum is very abundant, and much used in domestic and steam practice.

Ficus. The fig grows well with us in some of its more hardy varieties. Our cold winters occasionally cut them down. We grow a fig which, although cut by the frost nearly every winter, is still of so vigorous a habit as to spring up again and bear two crops of very excellent fruit during the season. There are many varieties cultivated in our State. During the past spring, the writer was presented with a box of most delicious figs grown and cured in the lower section of the State. More attention should be devoted to them as an article of commerce. No attempt is made to preserve them here, save in syrup and as pickles for the table, in which forms they are much esteemed.

Gentiana an article is brought to us from the country, which is not distinguishable in the root, from the officinal. The plant I have not had an opportunity of examining; we use it in the preparation of the officinal compounds. It could probably be obtained in quantities.

Punica granatum is much cultivated in the gardens for ornament and use. While in bloom the beautiful bell-shaped flowers are quite attractive. The fruit is generally esteemed, and its rind as well as the bark of the root used medicinally.

Hedeoma pulegioides covers our hill sides in the open woods and old fields. It may be mown with the scythe and raked like hay. With apparatus for distillation, the oil could be obtained on a large scale.

Humulus lupulus grows finely with us. My garden supplies my retail trade with a quality for which I realize double the prices usually obtained for the commercial article. Little or no attention is given to their cultivation by our farmers.

Linum. No attention is paid to the growth of flax except upon a very small scale for the seed used medicinally. Oil is not made at all.

Lobelia inflata, although not indigenous to our soil, has been introduced in places among us, and we are occasionally offered both herb and seed.

Maranta has never been tested in this section; a few plants obtained by the writer some years ago died, and the experiment has not since been repeated.

Mel. Much attention is given to the production of honey for the home market, and small quantities of wax are sent abroad. Wild bees are frequently found in our forests, where they deposit honey in the hollow trees. They are marked, and in due season the tree is felled, and the mangled comb extracted and brought to market. A more than ordinary courage is required for success in this undertaking. The honey is inferior in color and flavor to that of the domesticated bee.

Mentha piperita and *viridis* are easily established in our soil, and take the ground completely, producing abundant crops of herb. This plant, in our hot climate, abounds I think more largely in the essential oil than in the State of Michigan, where I have observed it in cultivation. There seems every reason to believe that the manufacture of the oil of peppermint would be quite profitable here under judicious management.

Monarda is abundant in old fields and along the road sides. No use is made of it.

Amygdalus communis. The almond, both sweet and bitter, have been grown successfully in the middle portion of Georgia. I know of no attempt having been made here.

Olea Europæa. Efforts have been made with success to introduce the olive upon our seaboard. It has not been attempted here.

Ricinus communis is found occasionally along our road sides. No use is made of it. It is said to drive moles from the gardens where it is grown.

Terebinthina. During a few years, the production of turpentine, rosin, and spirits has made some progress in our State. In my own immediate neighborhood the manufacture is as yet quite limited; not more being produced than is consumed in the counties immediately around us. The rosin accumulates on hand, and no arrangements are yet made for shipping it. Our distance from the seaboard precludes the probability of shipping it to advantage. Some experiments have been made in the distillation of the rosin-oil, and it is probable it may be advantageously disposed of in this way. The spirits is distilled from large

cast iron pots upon which are luted tin or sheet iron caps, and the vapor is condensed in the ordinary copper worm. No water is introduced with the turpentine. The heat is badly applied, so that a portion of the rosin is often decomposed, and the spirits somewhat contaminated with rosin-oil. When brought to us fresh from the still, the oil of turpentine is almost wholly free from the odor and taste termed terebinthinate, which it acquires by exposure. The flavor of pine bark freshly stripped from the tree, is scarcely more acceptable than the recently distilled oil.

Podophyllum peltatum is very abundant in low, moist woods. In many spots the roots may be obtained almost as rapidly as potatoes from the cultivated field, so thickly do they grow. It is much used in domestic and steam practice.

Prunus Virginiana is very abundant, and much used, both the bark and berries.

Sanguinaria is found abundantly scattered all through our forests. Much used under the name puccoon root.

Menispermum Canadensis is very abundant in low grounds along our rivers and small streams; much used as a tonic and alterative. It almost entirely replaces the *Smilax officinalis* with us.

Sassafras overruns our waste lands, and is usually considered a never failing indication of the poverty of the soil upon which it grows. *Sassafras* tea is a panacea with many; the pith is also much used.

Senega is found easily for domestic use. Whether it could be obtained in quantities sufficiently large to make it an article of regular export, I am unable to say.

Serpentaria is much more abundant, and could I think be made profitable. This is also much used. Two varieties are found and used indiscriminately. The distinctions between the two I have not examined with any care; they are probably contained in the books.

Spigelia is very abundant. It is occasionally offered in small lots for sale. It has gone much out of use with us.

Stillingia is indigenous, and used to some extent. I have not found it very abundant.

Stramonium is our "jimson" weed—a great pest.

Taraxacum is never found indigenous in our soil.

Ulmus. Our elm does not yield so mucilaginous a bark as that obtained from the Northern States.

Zingiber does not bear our climate well, unless it be protected during the winter. Besides the plants named, we have many which are used only in domestic and steam practice. With a few exceptions, we are unable to obtain a home supply of medicinal plants.

From the Proceedings of the American Pharmaceutical Association.

ON COLLODION.

By L. HOFMANN.

The author has occupied himself with the preparation of collodion for photographic purposes, and recommends the following process, which may also be rendered applicable in surgery by additions. The best addition is castor oil, to deprive the collodion of the property of contracting so strongly and becoming cracked.

1 part of loose, clean cotton-wool is immersed for a quarter of an hour in a mixture of 20 parts of dry nitrate of potash, and 30 parts of English sulphuric acid, in a suitable glass vessel, capable of being closely covered with a glass plate. During this time it is once strongly stirred. The mixture is then poured into a pail of pure water, and well washed, and this operation must be repeated until the last traces of salt and acids are removed. The xyloidine obtained is then put into a linen cloth, pressed sharply, and teased out before drying, so as to remove all knots. The drying is effected upon a common stove in a suitable sieve.

Schacht has already recommended the same proportions, but has not prescribed the employment of the dried salt, and he has also confined the time of action to 4-5 minutes. Xyloidine thus prepared did not dissolve so readily and completely in the mixture of ether and alcohol, and the preparation in course of time lost the property of dissolving easily. 6 parts of xyloidine, obtained by the above process, were dissolved by shaking in a mixture of 120 parts of ether, and 8 parts of the most highly rectified alcohol, and 3 parts of castor oil were added to the solution.—*Chemical Gazette*, October 15, 1856, from *Archiv der Pharm.*

ON THE ACTION OF WATER UPON GLASS.

By J. PELOUZE.

The author refers to the observations of Scheele, Lavoisier, Chevreul, and other chemists, upon the action of water upon glass, but remarks that no one has yet attempted to determine the extent of the alteration thus produced. The action of water upon glass reduced to powder is the principal object of his memoir.

The action of boiling water is excessively slow upon glass vessels in which it is boiled, and when cold it has still less action, but it decomposes powdered glass with extraordinary ease. Thus a bottle of half a litre scarcely loses 1 decigram. when water is boiled in it for five whole days; but if the neck be cut off and powdered and boiled in the same vessel for the same time, it loses nearly a third of its weight. The same vessel which has contained water for years without losing appreciably in weight, will lose 2 or 3 per cent. in a few minutes by simple contact with cold water when pulverized. The following are the results of some of the author's experiments:—

1. A specimen of white glass, of the best commercial quality, consisting of—

Silica	.	.	.	.	.	72.1
Soda	.	.	.	.	.	12.4
Lime	.	.	.	.	.	15.5
Alumina and oxide of iron	.	.	.	.	.	traces,

was very finely powdered on a plate of agate; 5.510 grms. were boiled in a porcelain capsule with frequently renewed distilled water. The clear liquids were evaporated and the residue calcined; it weighed 0.175.

The portion insoluble in water was treated with water acidulated with muriatic acid, when a pretty brisk effervescence was observed. The muriatic acid solution was saturated with ammonia, which produced a slight precipitate (alumina), an excess of oxalic acid was added, the oxalate of lime was collected, washed, dried, and decomposed by sulphuric acid; it gave 0.190 of sulphate of lime, representing 0.078 of lime, or 1.5 per cent. of the weight of glass employed. The glass containing 15 per

cent. of lime, we may conclude that the water had decomposed about 10 per cent. of the glass.

2. Another white glass, also of the finest quality, composed of—

Silica	77.3
Soda	16.3
Lime	6.4
Alumina and oxide of iron	traces.

5.180 grms. of glass were operated upon in precisely the same way as the last. The residue of the aqueous solution was 0.945 grm.; the weight of the sulphate of lime, 0.250, representing 0.103 of lime, or two per cent. of the weight of glass. The glass containing 6.4 per cent. of lime, 32 per cent. of the glass must have been destroyed. The residue of the aqueous solution contained 0.281 grm. of soda, or 5.6 per cent. of the weight of the glass: the remainder was silica. The glass containing 16.3 per cent. of soda, 34 per cent. of glass had been attacked.

The composition of the silicate of soda dissolved in the water was $3(\text{SiO}_3)\text{2NaO}$; at 302°F . it retained 2 equivs. of water.

3. The two kinds of glass just mentioned were agitated for a few minutes with cold water, a few drops of weak muriatic acid were added to the mixture, which was filtered immediately. The loss of weight of the glass and the amount of lime collected showed that the glass had lost 2 to 3 per cent. by this simple contact with cold water.

By boiling for a few minutes, the same glass lost nearly double, or between 5 and 6 per cent.

4. All sorts of commercial glass, when finely powdered and exposed to the air, are slowly decomposed, absorb carbonic acid by degrees, and after some time effervesce briskly with acids. The same effervescence takes place with acids in a mixture of powdered glass and water which has been left in the air for a few days. The acid water contains a large quantity of soda and lime.

Sulphuric acid also is almost always found; as most glasses contain sulphate of soda, varying in weight from one or two-thousandths to two-hundredths.

5. Finely-powdered glass, boiled with water into which a cur-

rent of carbonic acid is passed, absorbs this gas in a few moments, and afterwards effervesces briskly with acids.

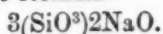
6. Powdered glass, boiled for several hours with sulphate of lime, produces a considerable quantity of sulphate of soda. This reaction explains why the walls and floors of workshops, in which plate-glass is polished, are always covered with an efflorescence of sulphate of soda. The plaster which serves to fix the glass furnishes the sulphuric acid, and the glass the soda, of which this salt is composed.

7. All glasses reduced to fine powder immediately restore the blue color of red litmus-paper and tincture, and change syrup of violets to green. Powdered glass which has undergone the action of cold water, continues to alter in boiling water.

8. Crystal-glass in fine powder, agitated for a few minutes with water containing a very small quantity of acid, gives a black deposit of sulphuret of lead by treatment with sulphuretted hydrogen. After half an hour's ebullition with water and the addition of an acid, 5 grms. of crystal in powder furnished 0.050 of sulphuret of lead, representing a decomposition of about 3 per cent. Flint-glass, which contains still more oxide of lead, undergoes a still more considerable decomposition.

Devitrified glass behaves like ordinary glass with water, except that it appears to be still more easily decomposed.

After boiling for five days, a specimen of glass similar in composition to the first-mentioned had undergone a decomposition corresponding to a third of its weight, and the silicate of soda yielded by it had also the formula—



Thus powdered glass is decomposed by contact with water or air with an ease and rapidity which appear very extraordinary, considering the great stability of vessels formed of cast or blown glass. Is the surface of the glass in this form in a particular state, which modifies its properties? This does not appear probable when we consider that plate-glass, from the surface of which several millimetres have been removed in polishing, is equally, if not more permanent in moist air and water than common glass, and that in all cases the crude plate-glass presents neither more nor less resistance to atmospheric agents than the others. The author regards the difference in action of water upon glass

in these two forms as due only to a different cohesion and mechanical resistance. The multiplicity of surfaces, and the facility of movement in the powder, hasten its alteration in water.—*Chem. Gaz.*, Sept. 15, 1856, from *Comptes Rendus*, July 21, 1856, p. 117.

DETERMINATION OF THE AMOUNT OF THEINE IN GUARANA.

By JOHN STENHOUSE, LL. D., F. R. S.

Guarana, as is well known, is a species of chocolate, manufactured from the fruit of the *Paullinia Sorbilis*, by the aboriginal tribes of Para, and other districts in Brazil, and extensively employed by them both as a refreshing beverage, and as a remedy against dysentery and similar diseases.

The presence of theine in guarana was first discovered many years ago by Dr. Theodore Martius, of Erlangen, and his observations were subsequently corroborated by Messrs. Berthemot, Dechastelus, and C. Jobst.

As none of these gentlemen, however, made any determination of the amount of theine in guarana, I thought it might be of some interest to supply the omission, especially as I had previously determined the quantity of theine present in all the other substances known to contain that alkaloid. Through the kindness of my friend John Miers, Esq., F. R. S., the well-known Brazilian traveller, I have recently been enabled to subject guarana to a new examination.

The specimen of Guarana, given me by Mr. Miers, was about seven and a half inches long, one and a quarter inches thick, and weighed nearly three-quarters of a pound. It had a rough corrugated surface, dark brown color, no odor, and a somewhat amygdaloidal fracture.

Twenty-five grammes of the specimen were very finely powdered, and boiled with one quart of distilled water for some time. When cold, a slight excess of basic acetate of lead was added, when a bulky brownish-red precipitate fell. This was repeatedly digested with hot water, and the clear liquid which passed through the filter was treated with a slight excess of sulphuretted hydrogen, till all the lead present in it was precipitated. The clear solution was then evaporated to dryness on the water-bath, and the resi-

due dissolved in a small quantity of boiling alcohol, and filtered. The filtrate was allowed to evaporate nearly to dryness, when yellowish-colored crystals were deposited. These were pressed between folds of bibulous paper and recrystallized out of spirits of wine, when they were rendered perfectly colorless. After being dried on the water-bath, they were weighed, when the twenty-five grammes gave 1.260 grammes, equal to 5.04 per cent.

A second determination, in which fourteen grammes were used, gave 0.715 grammes, equal to 5.1 per cent.

Average of the two determinations, 5.07 per cent.

In addition to théine, guarana contains a coloring matter, apparently analogous to the tannin in cinchona bark, and likewise a fatty matter which, like the fat of chocolate, does not appear to become rancid by keeping.

From an inspection of the subjoined table, it will be seen that guarana is the richest known source of théine:—

	Per cent. of Théine.
Guarana	5.07
Good Black Tea	2.13
Black Tea from Kemaon, E. I.	1.97
Various samples of Coffee Beans, from 0.8 to	1.00
Dried Coffee Leaves, from Sumatra	1.26
Paraguay Tea, from <i>Ilex Paraguayensis</i>	1.2

Pharmaceutical Journal, October, 1856.

ON A NEW MODE OF PREPARING RED OXIDE OF IRON ("ROUGE") FOR POLISHING GLASS AND METALS.

By M. A. VOGEL, Jun., of Munich.

We ordinarily use for polishing glass and metals, red oxide of iron (*colcothar, caput mortuum vitrioli*), which is procured in various ways, either by heating sulphate of iron alone or previously mixed with common salt, or by several other means. All these processes have, however, the inconvenience, that it becomes indispensable to wash the powder for a long time, in order to separate the finer from the coarser and harder parts. Even by long continued washing, it is difficult to arrive at absolute security in using it, without running the risk of wasting the labor of

several weeks, in consequence of the remains of coarse parts which have not been separated, notwithstanding the long washing. Therefore, a colcothar capable of being employed with safety is always in great demand and of high price.

These circumstances have induced me to seek a new process for procuring a colcothar which should be preferable to that prepared in the ordinary manner, however carefully washed.

Numerous experiments have shown me that the decomposed oxalate of protoxide of iron presents the proper means for accomplishing this object.

The oxalate of protoxide of iron heated in a close vessel out of contact with the air, gives iron pyrophorus, that is to say, metallic iron so finely divided that it inflames on contact with the air, and red oxide of iron is formed. This transformation takes place very rapidly, when we heat the oxalate of protoxide of iron in the air on a sheet of platinum, during which operation the matter undergoes a considerable augmentation of bulk.

Owing to the carbonic acid and carbonic oxide gases which are disengaged at this high temperature, the substance is thoroughly divided, and during this disengagement of gases, it absorbs oxygen from the air. We have consequently, in the disengagement of gases and in the absorption of oxygen, a means of reducing the oxide of iron to the state of as fine a powder as possible.

In order to procure colcothar according to the mode indicated, we operate in the following manner; into a solution of sulphate of iron made with boiling water and filtered, we pour a concentrated solution of oxalic acid, until no more yellow precipitate of oxalate of protoxide of iron is formed. When the liquid is quite cold and deposits nothing more, the precipitate is washed on a cloth with hot water until the washing water no longer gives an acid reaction.

The oxalate is afterwards heated in the partially dry state on an iron plate or in a boiler of the same metal, over a small charcoal fire or even a spirit lamp. The decomposition commences at the temperature of 200° C. (392° F.) and on raising the temperature a little, the red oxide of iron is formed, and is found in the finest possible state.

The colcothar formed by this mode affords perfect security of

the finest division of the product, and may be employed with the greatest success for polishing plate glass and the glasses used by opticians, without any previous washing.

The trials which have been made of this colcothar, in the arts, for polishing metals, principally gold and silver, have demonstrated that the finest polish may be obtained without even scratching the surface, therefore it may be employed for polishing Daguerreotype plates, telescopes and other objects of that kind. Moreover artizans have found that, by employing this colcothar, the operation of polishing glasses is very greatly accelerated.

Chemist, Nov., 1855, from Jour. de Pharm., July, 1854.

THE GUMS AND RESINS OF COMMERCE.

By P. L. SIMMONDS.

The subject which I have undertaken to open up for discussion this evening, is one embracing so many important articles of commerce, and extending over so wide a field of research, that I can scarcely hope to do common justice to any even of the great classes into which it naturally divides itself—much less to enumerate or particularize one-half of the various new gums and resins which I should desire to bring more prominently into notice. Any one of these gums or resins would have formed ample field for investigation and inquiry of itself, taking it in its several relations of origin, sources of supply, mode of procuring, quantity obtainable, price, chemical composition, and probable utility, as compared with other similar exudations and their commercial uses.

But in taking a rapid survey of the whole group of gummy and resinous exudations, any such close and full description would be utterly impossible—and as it is, I shall have to pass over much of the information I have arranged, leaving it for the quiet perusal and future consideration of those who feel greater interest, in its more extended form in the columns of the Society's *Journal*.

In the mode of treating my subject I hesitated at first as to whether it might not be useful to go over each quarter of the globe separately, giving distinct accounts of the gummiferous plants and products of Europe, Africa, Asia, Australia, and

America. But on reflection I found that this would entail much repetition, and I am, therefore, necessitated to fall back on the conventional classification usually adopted of true gums, resins, gum resins, oleo resins, and elastic gums, and I hope to be able to furnish something new to our current stock of information under each of these heads.

The importance of this class of commercial products will be better estimated by the statistics I shall be able to furnish of the trade, brought down to within the last year or two.

That there has long been a want of some more detailed information on the gums and resins of commerce will not be denied, for, although much has of late years been done by the several local and metropolitan exhibitions to collect and diffuse correct information, we are still lamentably deficient in details as to the plants that produce very many; and the learned Professor who presides on this occasion, knowing himself how difficult it is to identify plants without the presence of the leaves, barks, and necessary adjuncts, will readily be able to excuse any accidental errors I have fallen into, which his more experienced judgment may be able to correct. Much information respecting the gum-bearing trees of commerce and their products is doubtless to be found scattered through many home and foreign scientific periodicals, but this bears rather on their medicinal value than on their commercial properties and uses in the arts and manufactures, and grave errors continue to be propagated in standard works from day to day; even in a publication of weight and influence like the "*Encyclopædia Britannica*," most of the details in the articles as given in the new edition (as far as it has proceeded,) are nearly reprinted verbatim as issued in its pages some thirty or forty years ago.

There is another work of assumed authority, where one would naturally look for some recent information as to the progress of discovery in new gums and their applications, viz., *Dr. Ure's Dictionary of Arts and Manufactures*; but in the last edition of 1853, the article "Gums" stands verbatim as it did in the edition fifteen years previous, brief and meagre in its character, while that on Resins has merely an addenda of a page to the previous stereotyped matter.

Every one who brings the result of his researches and investigations to bear into the common stock, if he has been diligent and treated the subject fully and fairly, must contribute some few hints that may prove useful, and if I but succeed in doing this, I shall be satisfied.

I must premise that in order to assimilate my information to the erroneous nomenclature of city circles and commercial lists, I am obliged to depart to some extent from the true scientific definition, and shall speak frequently of many substances as "gums," which are properly gum resins, or pure resins. Were I not to do this, I should confuse many of those whom I see around me, and who have had to buy and sell by names which were erroneously given years ago, before chemical analysis had determined the true composition of many.

It has been well observed by Professor Solly (*Jury Reports*, p. 71), that "a great deal of practical inconvenience and confusion is caused by the indiscriminate manner in which the term *gum* is used in commerce and the arts. It would certainly be an advantage if the distinctions employed in scientific books, were to be generally adopted by merchants and drug-brokers, the term *gum* being solely applied to those natural vegetable exudations which soften or dissolve in water, and yield a more or less perfect mucilage, but which are wholly insoluble in spirit; the term *resin* being applied to those fusible and combustible vegetable substances which are quite insoluble in water, but which soften and dissolve in ether, the "essential oils," and "spirits of wine," and the term *gum resin* being used to designate those mixtures of gum and resin which are intermediate in properties, and partake of the nature of each, being partially and imperfectly soluble both in water and in alcohol."

Gum, properly so called, is used in large quantities for a number of purposes in the arts. It is generally distinguished into soluble gum, or gum Arabic, which readily and perfectly dissolves in water, forming a clear mucilage, and cherry-tree gum, or gum tragacanth, and those difficultly-soluble kinds of gum, which, though they soften easily, do not readily form mucilage. Gum is extensively used in finishing and giving lustre to crapes, silk goods, &c., by calico printers, shoemakers, and in other trades.

As instances of the immense traffic carried on in gums, I may

state that one Liverpool firm imported in three years Gum Senegal to the value of £100,000. Gums to the value of 3½ millions of francs have been shipped annually from Alexandria. The exports from Morocco reach to 250 or 300 tons, and India exports 1500 or 1600 tons.

The Gum Arabic of commerce is the produce of various species of acacia, which yield this substance in considerable quantities, particularly *A. vera*, a native of Arabia, and of Africa, from Senegal to Egypt, which supplies the finest qualities; *A. Arabica*, a smaller tree, common in India and Africa, which yields part of the Turkey and East India gum; the red pieces constituting the gum gedda and gum babool of commerce.

A. gummifera, a high, thorny tree, found near Mogador, the coast of Guinea, and in Arabia, furnishes what is known as Barbary gum, a darker variety.

A. Senegal yields part of the Senegal gum, the tears of which are usually in larger masses than *Arabic*, of a darker color, and more clammy and tenacious. The trade in this variety is chiefly in the hands of the French, and we have imported supplies occasionally from France.

In the Cape colony, gum is collected by the Kaffirs from a species of *Acacia* closely resembling *A. vera*, which Burchall, in his "Travels into the Interior," calls *A. Capensis*, the *A. karoo*, probably, of Hayne, Nies, and Ebermaier, which is abundant on the banks of the Orange River. It is of a pale yellow color, and is not considered by the dealers so good as that obtained in the more northern parts of Africa.

The ordinary Cape gum of commerce exudes spontaneously from the bark both of the trunk and branches of the thorn tree (*Acacia horrida*, Willd.).

A considerable trade was carried on by the Cape colonists a few years ago with Kaffirland for the gum gathered from the *Mimosa* tree. Wagon-loads were constantly being sent off to Port Elizabeth for shipment to the London market. It was extensively used by calico-printers, calenderers, makers of stationery, and in various industrial arts. The exports have declined from 4976 cwts. in 1849, to 72 cwts. in 1853. The reason for this decline is curious. By mere accident it was discovered that a gum could be manufactured from potatoes or wheat. This

article—now called British gum—dextrine, or gum substitute, has superseded the more expensive in almost every department of manufacture and art in which it was used—hence the demand for Kaffir gum is at an end. British gum is found to possess adhesive properties equal to gum Arabic, being less liable to be affected by climate; it is therefore used for postage-stamps, envelopes, &c., as well as in manufactures, and it can be produced for less than one-fourth the cost.

Some fortunes have been made by the discovery, which originated in pure accident, and which is stated to have been made as follows:—

A fire took place in a manufactory of starch from potatoes, near Dublin. The burning building was deluged with water from the fire-engines, and the starch washed about in every direction. A man fell down into the flood of calcined starch and water, but thought no more of it until next morning, when dressing himself he found the legs of his trowsers, sleeves of his coat, pockets, and every other opening firmly obstructed. On examination he thought he had fallen into gum, but on revisiting the scene of the fire he discovered that the properties must be contained in the potato starch, and by a few simple experiments he made a discovery which has resulted in large profits.

According to the statement of Dr. Vaughan, of Aden, the acacia which yields gum Arabic is generally a small shrub, of a dry and withered appearance; occasionally, however, it shoots out into a tree of from twenty to thirty feet high. The Somalis, on the north-east coast of Africa, collect the gum during the months of December and January. The process of obtaining it is extremely simple; long incisions are made in the stem and branches, from which the juice flows, and when dry is removed. After the gum of a district has been gathered, it is sewn up in goat skins, and brought on camels to the great Berbera fair, or to some of the smaller settlements on the coast, and thence shipped to Aden and India.

There are three descriptions of the gum, styled severally Felick, Zeila, and Berbera. None of the first-named, which is esteemed the best, finds its way to Aden, the mass being usually bought up by the Banians or Hindoo merchants, and shipped direct to Bombay, where it realizes about 50s. the cwt. The other two

named varieties are called after the ports of shipment, and only fetch about half the price of the Felick gum. In 1851, 250 tons of gum Arabic passed through the Aden custom-house, the selling price there being about 24s. the cwt.

The local names for the gum Arabic, or Summuk, are adad, wadi, and anhokib, of which the anhokib is considered the best. It sells at Bunder Murrayeh for $1\frac{1}{2}$ dollars per frasila of 20 lbs. The tree is found on the mountain sides, in good red soil, and varies in height from ten to twenty feet. The inferior qualities of gums are sold at a much lower rate.

During the hot season the men and boys are daily employed in collecting gums, which process is carried on as follows:—About the end of February or the beginning of March, the Bedouins visit all the trees in succession, and make a deep incision in each, pulling off a narrow strip of bark for about five inches below the wound. This is left for a month, when a fresh incision is made in the same place, but deeper. A third month elapses, and the operation is again repeated, after which the gum is supposed to have attained a proper degree of consistency. The mountain sides are immediately covered with parties of men and boys, who scrape off the large clear globules into one basket, whilst the inferior quality that has run down the tree is packed separately.

The gum when first taken from the tree is very soft, but hardens quickly. Every fortnight the mountains are visited in this manner, the trees producing large quantities as the season advances, until the middle of September, when the first shower of rain puts a close to the gathering of that year. Large quantities of gum Arabic are collected by persons in the employ of the Egyptian government, and brought to Cairo in the caravans to be warehoused. The annual return occasionally reaches to 20,000 packages of 78 lbs. each.

In Morocco, about the middle of November, that is, after a rainy season, which begins in July, the gummy juice exudes spontaneously from the trunk and principal branches of the *acacia* tree. In about fifteen days it thickens in a furrow, down which it runs, either in vermicular (or worm) shape, or commonly assuming the form of oval and round tears, about the size of a pigeon's egg, of different colors, as they belong to the white or

red gum tree. About the middle of December, the Moors encamp on the border of the forest, and the harvest lasts six weeks.

The gum is packed in very large sacks of leather, and brought on the backs of bullocks and camels to certain ports, where it is sold to the French and English merchants. It is highly nutritious. During the time of harvest, of the journey, and of the fair, the Moors of the desert live almost entirely upon it, and experience proves that six ounces of gum are sufficient for the support of a man twenty-four hours.

Gum is largely collected in Central Africa, and sent to the coasts of the Mediterranean and the oceans. Gum Arabic and Senegal to the value of £12,000 are exported; other sorts of gums to the value of £12,000, and resins and varnishes to the value of £6000. From Senegambia the quantity of gum exported is given at 25,000 quintals or cwt., of which 9000 go to France, 6000 come to this country, 4000 go to Portugal and the United States, and about 6000 are sent by the caravans of Fezzan and Morocco to other parts of Central Africa.

In the Indian bazaars, the products of a variety of trees are mixed and indiscriminately vended as gum by the native druggists. Among them are gum from the neem, the mango, the babool, (*A. arabica*), *Cassia auriculata*, cotton-tree, and several others. They are much inferior, however, to the gum of the *Acacia vera*.

A large quantity of excellent gum is procured in the East from the wood apple (*Feronia elephantum*), which much resembles gum Arabic in chemical and serviceable proportions, and from its ready solubility it gives the best mucilage for making black ink.

Dr. Wight tells us that good gums are obtained by the natives of Coimbatore from the following plants:—*Aegle marmelos*, *Prosopis spicigera* and *Acacia sundra*; and very fair kinds from *Melia azadirachta*, *Acacia odoratissima*, *Conocarpus latifolia*, *Soymeda febrifuga*, *Odina wodier* and some others.

The bastard ebony tree of Central India, and also many other of the forest trees which abound there, yield large quantities of rich and valuable gums. Dr. Spry collected as many as fifteen varieties in one locality.

There are more than 130 species of the acacia in Australia, and from them exudes the purest gum Arabic. It is so plentiful that at particular periods several pounds may be collected in some places in an hour or two. It possesses all the good properties of the gum from Arabia, and is used successfully for the same purposes in the colony. The *Acacia Senegal* or *Mimosa Senegalensis*, a tree rising fifteen to twenty feet high, affords the Senegal Gum of commerce, which does not differ essentially from the gum of *Acacia vera*, except in the shape, and being somewhat less soluble. In 1849 we imported 5696 cwt. of gum Senegal direct from Senegambia, and 256 cwt. from Morocco, whence the imports in 1853 reached to 2838 cwt. In 1840, we imported 601 cwt. from the Gambia, and in 1851, 850 cwt. of gum Senegal, but none in subsequent years. In the Algerian collection at Paris, mention is made of Mesteba, an indigenous gum of Northern Africa, of which little seems to be known, except that it forms an article of traffic at the markets of the oases in the Algerian desert.

Another white gum, called Aourouar, is also spoken of, and which is said to be shipped to England by the way of Souira; a darker gum yielded by a tree called toleukh, is brought by the caravans from Timbuctoo. These are probably some of the darker and less valuable gum Arabics which come into commerce under the name of Barbary and other gums.

MEZQUITE GUM.—Attention has recently been called in the United States to the discovery, in great abundance, of a species of acacia, known as the mezquite tree, which furnishes large quantities of gum, nearly equal to the gum Arabic of Africa. It will no doubt prove a valuable source of revenue to the State of Texas, New Mexico, and the adjacent Indian territory, besides affording employment to the different tribes of Indians, now roving upon the plains, many of whom would be glad to gather and deliver it to the different frontier government posts for a very small compensation.

The mezquite is by far the most abundant tree of the plains, covering thousands of miles of the surface, and always flourishes most luxuriantly in elevated and dry regions. The gum exudes spontaneously in a semi-fluid state from the bark of the trunk and branches, and soon hardens by exposure to the atmosphere,

forming more or less rounded and variously-colored masses, weighing each from a few grains to several ounces. These soon bleach and whiten upon exposure to the light of the sun, finally becoming nearly colorless, semi-transparent, and often filled with minute fissures. Specimens collected from the trunks of the trees, were generally found to be less pure and more highly colored than when obtained from the branches.

The gum may be collected during the months of July, August, and September; but the most favorable period for that purpose is in the latter part of August, when it may be obtained in the greatest abundance, and with but little trouble. The quantity yielded by each tree varies from an ounce to three pounds; but incisions in the bark not only greatly facilitate the exudation, but cause the tree to yield a much greater amount. As it is, a good hand will probably be able to collect from ten to twenty pounds in a day. Were incisions resorted to, double the amount might be obtained.

A simple, pure gum, was recently shown at Madras, obtained in Travancore, from the *Macaranga indica*, which has been used for taking impressions of leaves, coins, medallions, &c. When the gum is pure and carefully prepared, the transparent impressions are as sharp as those of sulphur, without its brittleness. The exudation appears to be an entirely unknown production.

Keekur gum, a variety of Arabic, is produced by *Vachillia farnesiana*. *Acacia sirissa* in India yields a large quantity of a clear gum known as Dirisani gum, and closely resembling Keekur gum. Booraga, obtained from *Bombax malabricum*, is a pure gum.

TRAGACANTH is a gummy exudation, obtained from various species of *Astragalus*; *A. verus* (Olivier), *Gummifera creticus* (Lamarek), which is imported for medicinal purposes from Smyrna and other ports in the Levant, to the extent of about five or six tons per annum. It is obtained principally from Northern Persia, Asia Minor, and America. Hamilton (Researches in Asia Minor, &c.,) states that tragacanth, which is called by the Turks "kittereh," is collected in large quantities in the hills about Buldur, from a low prickly plant, resembling a species of furze. The white flaky gum is obtained by making an incision in the

stems near the root, and cutting through the pith, when the sap exudes in a day or two and hardens in the opening, after which it is collected by the peasants. Its price there was about 3s. 2d. per lb. ; 23 tons were imported in 1850 from Smyrna, and the imports have since annually increased, until in 1853 they reached nearly 70 tons.

A spurious tragacanth is obtained in the East from the *Sterculia urens* and *S. foetida*, and an inferior tragacanth is also procured from *Cochlospermum gossypium*.—*Journ. Frank. Inst. from Journ. Society of Arts, London, Nov. 1855.*

(To be continued.)

ON THE SUPERPHOSPHATE OF DECOMPOSED BONES.

By W. WICKE.

Starting from the supposition that the acid phosphate of lime in the bones is very soon converted into neutral phosphate in the soil, the opinion has been set up that the superphosphate only acts by its fine state of division. It has even been recommended to precipitate again the acid phosphate of lime rendered soluble by sulphuric acid by means of lime, and to incorporate this with the soil.

As far as I am aware, no experiments have been made upon the behaviour of the superphosphate towards the ordinary constituents of the soil, which may have a neutralizing action upon it ; I mean towards carbonate of ammonia, as the ordinary product of decomposition of the organic constituents of urine and carbonate of lime. Both these bodies certainly have a decomposing action upon the superphosphate, but not of such a nature as to separate the whole of the phosphoric acid in an insoluble compound. In the former case a sufficient quantity of phosphate of ammonia for the requirements of the plants, and in the second an acid salt, remains in solution.

For this experiment I employed very pure marl. If the superphosphate be filtered through the marl, or left in contact with it for a long time, a portion of the phosphoric acid is certainly combined with evolution of carbonic acid, but the salt is not entirely precipitated. Even in this case we present immediately to the plant a phosphate which is soluble in water.

The soluble salts of iron have an injurious action upon decomposed bones as a manure. A loss must take place. A solution of sulphate of iron immediately produces a white precipitate with an aqueous solution of superphosphate, and this perceptibly increases, so that the greater part of the phosphoric acid is soon separated as an insoluble iron-salt.

Bones decomposed with sulphuric acid are extracted with water at a gentle heat. The yellowish filtrate has a strongly acid reaction.

15 cub. centims. of solution contained 0.0103, or 0.0686 per cent. of sulphuric acid, and 0.0225 or 0.15 per cent. of lime, leaving 0.0153 of lime for the phosphoric acid.

15 cub. centims. of the solution contained 0.1047, or 0.698 per cent. of phosphoric acid. The equivalent proportion of the lime to the phosphoric acid is therefore as 1 to 3.

15 cub. centims. of the solution were mixed with carbonate of ammonia until the production of a weak alkaline reaction. A strong white precipitate was produced, which gave on analysis 0.043, or 0.286 per cent. of lime, and 0.0313, or 0.2086 per cent. of phosphoric acid. Proportion of lime to phosphoric acid as 1 to 3.

The filtrate still contained 0.0706, or 0.4706 per cent. of phosphoric acid. The whole quantity of phosphoric acid was 0.1047

Obtained	0.1019
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Loss	0.0028
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Experiment with Marl.—The superphosphate remained for several days in contact with the marl. It was then filtered, and the fluid brought to its original quantity (15 cub. centims.). The filtrate had an acid reaction. It contained 0.101, or 0.073 per cent. of lime, and 0.0783, or 0.5835 per cent. of phosphoric acid.

From these experiments it appears that it is not advisable to convert the superphosphate again into tribasic phosphate of lime by the addition of lime. By the action of ammonia upon the acid product, the desired state of fine division is at once produced, whilst another portion of the phosphoric acid can be drawn up by the plants in the form of phosphate of ammonia at the commencement of vegetation. This is also the case when carbonate of lime acts upon the superphosphate.—*Chemical Gazette, September, 1856, from Liebig's Annalen, July, 1856.*

Varieties.

Solubility of Gallic Acid in Glycerin. By THOMAS WEAVER, Pharmacist, Philadelphia.—I notice in the last number of the *Reporter*, an article headed "A New Astringent Preparation;" the concluding remark of the writer is as follows: "It is singular that glycerin does not possess the same property towards gallic acid" (*i. e.* to dissolve it). In some experiments that I performed last spring, I found gallic acid to be soluble in glycerin to the extent of 40 grains to the ounce, which solution may be diluted to an unlimited extent with water without precipitating the acid. I have been led to make this communication from a belief that such a solution might be of use where the peculiar chemical effect of tannic acid on animal tissue might be objectionable.—*Med. and Surg. Reporter.*

Cure of Itch in half an hour by use of Sulphur in a liquid form.—Dr. E. Smith called the attention of the Fellows of the Medical Society of London to an article in the *Gazette Hebdomadaire*, by Dr. Bourguignon, in which is a confirmation of the value of the treatment of itch, in Belgium, by sulphur, combined with lime in a liquid form. The remedy is prepared by boiling one part of quick-lime, with two parts of sublimed sulphur, in ten parts of water, until the two former are perfectly united. During the boiling it must be constantly stirred with a piece of wood, and, when the sulphur and lime have combined, the fluid is to be decanted and kept in a well-stoppered bottle. A pint of the liquid is sufficient for the cure of several cases. It is sufficient to wash the body well with warm water, and then to rub the liquid into the skin for half an hour. As the fluid evaporates, a layer of sulphur is left upon the skin. During the half hour the acarus is killed; and the patient is cured. It is only needful then to wash the body well, and to use clean clothes. In Belgium, the treatment is introduced by first rubbing the body for half an hour with black soap, but this does not appear to be necessary. The only essential act is that of the careful application of the fluid sulphur. The lime is of no importance in the treatment, except to render the sulphur soluble, and such would probably be the case if potass or soda were employed. The chief point in the plan thus employed, which is an improvement upon the mode of application of sulphur in lard, is the more ready absorption of the remedy, and consequently the more certain and quick destruction of the insect, by using sulphur in a fluid form. In so disgusting a disease, it must be of great moment to be able to cure it in half an hour.—*Med. Times and Gaz., March, 1856.*

Vitis Vinifera—(Grape-vine.)—Dr. Simmons, of Georgia, recommends the root as a diuretic. He burns it to ashes, and then adds two table-spoonfuls of the ashes to a pint of boiling water, and the patient drinks of this *ad libitum*; or, he adds, in some cases, two ounces of bitartrate of potash. He has cured cases of anasarca by giving the above quantity daily.—*Memphis Medical Recorder*.

[Dr. Simmons can hardly mean that grape-vine ashes possess any peculiar effect beyond the alkali they contain? Will not hickory ashes and poke-weed (*Phytolacca*) ashes, both of which contain much potash, answer equally well?—ED. AM. PHARM. JOUR.]

Poisoning from swallowing Chloroform.—The *Philadelphia Medical Examiner* contains an interesting case of death following the ingestion of about one ounce and a half of chloroform, diluted with about the same quantity of water. The patient was an intemperate woman, who swallowed the liquid by mistake, supposing it to be sweet spirit of nitre. The first symptoms were those of intoxication, followed by insensibility, stertorous breathing, slow and feeble pulse, and great contraction of the pupils. She lived for about thirty-six hours, and died asphyxiated, having recovered her senses for several hours before death. The stomach was paler than usual, except in streaks a quarter of an inch in width, from which it was inferred that the organ had been thrown into folds by the irritation of the chloroform, so that only a portion of its surface had been acted on. The mucous membrane was much softened.

Spender's Chalk Ointment in Ulcers of the Leg.—Dr. Patterson has collected 125 cases of chronic non-specific ulcers of the leg, in which, under this mode of treatment, the cure has been rapid and complete. The following formula he prefers: R. *Cretæ preparatæ*, 4 lb.; *adipis suilli*, 1 lb.; *olei olivæ*, 3 oz. Having heated the oil and lard, add gradually the chalk, finely powdered.

The ointment and a bandage being once applied, it is left until the cicatrix forms and becomes firm.—*Edinburg Medical Journal*.

Iodide of cadmium.—This new preparation of iodine is coming into general use in hospital practice, in place of iodide of lead and iodide of zinc, as it makes a white ointment more effectual in dispelling glandular enlargements, and not so like paint as iodide of lead.—*Assoc. Med. Journ.*

Squills will kill Rats.—It should be generally known that powdered squills is destructive to rats. Mixed with strong-scented cheese in equal proportions, it is said, when eaten, to kill them very speedily.—*Nashville Journal of Med. and Surg.*

Poisoning by Oil of Turpentine.—Marechal of Tours mentions a case of poisoning by oil of turpentine, caused by a woman living for several days in a recently painted room. The symptoms were those of painter's colic. He considers that this disease is not produced, as is usually supposed, by the white lead, which is non-volatile, but by the evaporation of the oil of turpentine, whose poisonous action he has proved by several experiments. *Revue Medicale.*

Paper from Moss.—A Dr. Terry of Detroit, who has been experimenting on a half ton of moss obtained in Lake Superior region, according to the Cleveland Plaindealer, affirms that it makes beautiful white paper without any peculiar process. The moss is represented to exist in great quantities on Isle Royal and several other localities in the vicinity, and can be procured at a very moderate cost.

Cod-Liver Oil Chocolate.—Numerous attempts have been made to disguise the nauseous taste of cod-liver oil, and to render it more acceptable to delicate stomachs. The chocolate, it is said, is likely to remove the objections heretofore urged against its use. It is odorised with cinnamon, bitter almonds, peppermint, etc., so as to give it an agreeable flavor, and to cover perfectly the fishy taste of the oil. The prepared oil chocolate, it is stated, agrees well with even the most delicate stomachs, and is eminently adapted to all diseases of a debilitating character.—*Monthly Stethoscope and Medical Reporter.*

Death from Drinking Naphtha.—The London Lancet records a case of death from drinking about three ounces of naphtha, used for burning in lamps. The patient was a lad twelve years of age. The symptoms were at first those of excitement, speedily followed by stertorous breathing and a state of collapse. Death took place in less than three hours. At the post-mortem examination, the preservative action of the naphtha was very remarkable. The weather was very hot, and although three days had elapsed since death, all parts of the corpse were as fresh as if the lad had recently died. The blood was everywhere very fluid. The lungs were not at all congested, and the coats of the stomach were found to be very little affected by the presence of the poison. The smell of naphtha pervaded the whole of the tissues, and was very perceptible immediately on opening the head.

Leeches.—In the travels of Joseph Dalton Hooker, M. D., through Sikkim and Nepaul Himalayas, the following statements occur:—

“Leeches swarmed in incredible profusion in the streams and damp grass, and among the bushes; they got into my hair, hung on my eyelids,

and crawled up my legs and down my back. I repeatedly took upwards of a hundred from my legs, where the small ones used to collect in clusters on the instep; the sores which they produced were not healed for five months afterwards, and I retain the scars to the present day. . . . Another pest is a small midge or sand-fly, which causes intolerable itching and subsequent irritation, and is in this respect the most insufferable torment in Sikkim; the minutest rent in one's clothes is detected by the acute senses of this insatiable blood-sucker, which is itself so small as to be barely visible without a microscope. We daily arrived at our camping ground, streaming with blood, and mottled with the bites of peepsas, gnats, midges, and mosquitoes, besides being infested with ticks." (Vol. II. p. 18). "A large tick infests the small bamboo, and a more hateful insect I never encountered. A traveller cannot avoid these insects coming on his person (sometimes in great numbers) as he brushes through the forest; they get inside his dress and insert the proboscis deeply without pain. Buried head and shoulders and retained by a barbed lancet, the tick is only to be extracted by force, which is very painful. I have devised many tortures, mechanical and chemical, to induce these disgusting intruders to withdraw the proboscis, but in vain." (Vol. I. p. 166.)

Apothecaries in Valparaiso.—They are chosen weekly,—to keep their shops open all night. In case of sickness among the citizens, requiring medicine after evening hours, the nearest *vigilante*, or as we say, policeman, is called. He takes the recipe and passes it to the next, and so on to the shop open for that night, and the remedies are immediately returned to the house, through the same expeditious channel, without trouble to the sick.—*Life Illus.*

Poison of the African Toad.—The Rev. Francis Flaming's recent work on Southern Africa, has the following in relation to reptiles of that region. There is a monster toad there which has more terrifying celebrity than the puff-adder. It is about a foot long and eight inches broad, with a spotted green back, yellow belly, and large red eyes, which the Kaffirs say spirt fire. All animals, as well as man, abhor this loathsome and most shocking looking creature. To show its poisonous qualities, this fact is chronicled.

A pedlar sold a cask of native wine to three Dutch boers who lived together on a farm in the district of Clanwilliam, in old Cape Colony. Two of them died soon after drinking a cup full. The third brother returned from a hunting excursion, and on discovering the melancholy facts of their death, accused the pedlar of murdering them with poisoned wine. He declared his innocence, and to show that the wine had no agency in the death of his brothers, drank of it himself, and in a few minutes was a corpse! On opening the cask to discover the nature of the poison, one of those awful African toads was found at the bottom.

NEW YORK COLLEGE OF PHARMACY.

At a meeting of the Board of Trustees of the College of Pharmacy of the city of New York, held on the 6th of Nov., 1856, the following resolutions were adopted, and the Secretary instructed to forward a copy to the American Journal of Pharmacy for publication :

"*Resolved*, That the College of Pharmacy has received the melancholy intelligence of the death of our respected fellow member, BENJAMIN CANAVAN. We would refer to his strict moral integrity and professional ability as examples worthy of emulation. In his death the College has lost a valuable co-laborer, and society a useful citizen.

"*Resolved*, That we offer our condolence to his friends and relatives for our common bereavement."

G. W. BERRIAN, Jr., Secretary.

Editorial Department.

PATRONAGE OF PHYSICIANS AND THE APOTHECARY.—In those countries where pharmacy is regulated by law, and efficiency sustained by a sort of medical police, it is presumable that physicians have but little trouble in feeling assured that their prescriptions will be carefully dispensed. In the United States and in England, where the widest latitude exists in the practice of pharmacy, any person being legally at liberty to open a shop, the same reliance cannot be had, and hence it is natural that the physician should seek to assure himself of the quality of the medicines he prescribes. In doing this, however, there is some danger that unintentional injustice will be done to meritorious young men, who commence their business career fully intending to conduct their establishments on correct principles, by physicians getting the habit of sending their patients to stores having a wide reputation. With this qualification, we approve of the following article from the New York Medical Gazette :

"APOTHECARIES, QUACK MEDICINES, &C.

DEAR SIR,—In an article on the above subject, which you kindly published in your last issue, I promised an attempt to sustain the assertion there made, attributing inefficiency in the education of Apothecaries, both pharmaceutical and ethical, chiefly to delinquency on the part of the medical profession. Having your tacit permission, I will endeavor briefly to redeem that promise.

Firstly.—The physician enjoys the power of establishing a confidence in the meritorious Apothecary, as the community acquire but a limited knowledge on the subject of Medicine, and that, generally, under reluctant circumstances ; they always defer to the judgment of the physician for any necessary information.

I would ask, how is that power often exercised, which should be influenced mainly in favor of competency and integrity ?

Many physicians, from motives of delicacy or supposed policy, studiously avoid giving any preference to Apothecaries, thereby virtually recognizing no

distinction, and operating to the injustice of those who have properly qualified themselves to pursue the vocation with skill and fidelity.

I contend that physicians are as culpable in not expressing a preference, where just cause for preference exists, as in a preference for an unworthy purpose; and I would not for a moment question the acuteness of their perception, by supposing that pharmaceutical knowledge and moral integrity can long remain hidden from their observation. Surely the respected physician sufficiently enjoys the confidence of those who entrust their lives in his keeping, that he may advise them where to rely for pure medicines, without the fear of sinister motives being charged upon him. That such confidence is sometimes abused is no argument against his good intent, any more than hypocrisy is an argument against true religion; time will separate the dross from the pure gold, when the latter will appear brighter by the contrast.

As I aim to address myself to the respectable portion of the profession, whose short-comings, as connected with Apothecaries, would appear to be those of omission rather than of commission, I need hardly allude to the injurious effect produced by that portion of the profession who, if not openly, yet effectually encourage Quackery, and participate in its profits—nor to those who, in their cupidity, make arrangements with the equally culpable venders of drugs to divide the profits arising from their prescriptions, thereby offering temptations to the useless prescribing of expensive medicines by the physician, and to exorbitant charges for the same by his coadjutor.

Secondly.—If the treatment of disease requires anything beyond a mere form, medicine must possess some value, and that value is proportioned to the uniform purity of the base, and the skill exercised in its preparation; hence the physician is but consulting his own interest and the health of his patient in selecting those who possess the knowledge and integrity to prepare his prescriptions with accuracy.

An eminent writer truly remarks, that 'the love of money and the desire of promotion are two most powerful incentives to action.' The laudable desire of promotion is evinced in an effort to merit and possess the confidence of physicians, and through them of the community; and in that confidence to receive such encouragement in the duties of his profession, and such reward for his labors, as will give tangible evidence of the promotion sought for—while proving practically that knowledge and integrity are the sure stepping-stones to honorable success in his calling. In the absence of such encouragement, I fear that Apothecaries (like other mortals requiring a stronger incentive to do right, than the abstract love of it,) will degenerate into mere medicine venders, seeking a livelihood in the sale of secret preparations, which in many cases professing impossibilities, are thrust upon the public by unprincipled persons under fictitious names, whose whole object is to live without honest labor, by preying upon the credulity of others. Conclusively, then, it behoves the medical profession to regenerate the divine art, by drawing a distinct line between educated Apothecaries and mere medicine venders, and thereby stimulate the rising Apothecaries in the conviction that it is profitable as well as honorable to seek that knowledge which will enable them to appreciate the purposes of a

RETRORT."

BLANCARD'S PILLS OF IODIDE OF IRON.—The Agent for this preparation has sent us a specimen of the pills, of which an advertisement will be found in the annexed sheet. Each pill is represented to contain 5 centigrammes (three-fourths of a grain) of protiodide of iron, and one centigramme (one-seventh of a grain) of metallic iron, and over this, a very thin coating of tolu, which forms a varnish impervious to the air. To be assured of the absence of free iodine, the manufacturer attaches a piece of

silver foil on the inside of the cork, which will become coated with iodide should decomposition commence. As a specimen of pharmaceutical skill these pills are deserving of commendation. When a pill is shaken in a test tube with a little water for five or ten minutes the water gives indications of iron and iodine by the appropriate tests, showing that the coating does not prevent the action of that fluid—a fact of importance in relation to their medicinal efficiency.

New Remedies: with formulæ for their preparation and administration. By ROBLEY DUNGLISON, M. D., &c. &c. *Seventh Edition, with numerous additions.* Philadelphia. Blanchard & Lea. 1856. Pp. 769, 8vo.

It is no inconsiderable evidence of the yet imperfect state of the healing art that its votaries should be constantly longing after something new—new theories in pathology—new remedies in therapeutics. However well known medicines may be able to meet the indications required, there is a certain something—a sort of charm—in the idea of arriving at the same results by an untrodden path that stimulates many medical observers to extend their researches among the numerous substances which the chemist and the botanical explorer are almost daily bringing to light. Substances which for years have been known only as rare curiosities to the chemist, suddenly, as by the wand of an enchanter, become plentiful in the market at the demand of the therapist, and plants previously known only to the traveller in some far off region are gathered and brought to us at the instigation of the same magician, by the ubiquitous arms of commerce. The study and application of these novelties enters largely into *medical progress*, and the co-operation of the pharmacist is constantly needed to aid in fitting them for the uses to which they are destined.

The work of Dr. Dunglison, embracing over 750 pages, devoted to “new remedies,” now again brought out in a seventh edition, corroborates what we have said above, by proving the necessity of catering to this want. Although intended more particularly for the practitioner as a body of information ready at hand in reference to “new remedies,” it also has uses for the pharmacist, inasmuch as the author has aimed at giving the processes of preparing and the modes of administering new substances as well as their therapeutic properties and uses. Dr. Dunglison as a compiler has the merit of giving careful references to the sources of information, which renders his book often exceedingly useful to investigators who wish to pursue the study of articles more closely than the scope of this work will admit. A work of this kind is necessarily in great measure a reprint of the previous edition, yet in looking over many articles, we find them extended and brought up to the present. Among the new items we may mention *apiol*, *cafein*, *carbazotic acid*, *cedron*, *cerium*, *cinchonin*, *hyposulphite of soda and silver*, *nickel*, *permanganate of potassa*, *quinidia*, *rennet*, and *tellurium*, as being the most prominent. So unceasing is the

suggestion of new agents, that already since the publication of this book several have been brought forward in the Journals, as valerianate of ammonia, ammonio ferric alum, and so it will continue, until their number merits another edition of the "New Remedies."

Hand-book of Inorganic Chemistry; for the use of Students. By WILLIAM GREGORY, M. D., F. R. S. E., &c. Fourth American from the Third English edition. To which is added the Physics of Chemistry, by J. MILTON SANDERS, M. D., &c. New York. A. S. Barnes & Co. 1857. Pp. 426.

Hand-book of Organic Chemistry; for the use of Students. By WILLIAM GREGORY, M. D., &c. Fourth American from the Fourth London edition. Edited by J. MILTON SANDERS, M. D., &c. New York. A. S. Barnes & Co. 1857. Pp. 480.

Four years ago we had occasion to notice the first American edition of the above works of Dr. Gregory, then published jointly under the title of "Outlines of Chemistry for Students." Since then, it would appear from the above title pages, two other editions have been published, neither of which we have met with. Being aware of the change of the name of the work from "Outlines" to "Handbook," and of the issue of the Organic and Inorganic portions in separate parts, we were not a little gratified on receiving the volumes in their new form, and promised ourselves a more deliberate examination of the Organic part than a brief glimpse of the English edition had enabled us to obtain. The result of this examination we will now present. Of the 426 pages of the inorganic chemistry, 191 pages are devoted to a compilation of the "physics of chemistry" by the American editor, who deemed the omission of any notice of *light, heat and electricity* in the English work as a defect in reference to its use as a text book here. Of this addition nearly one half is devoted to the general properties and photographic relations of light, in which the practical details of photography are entered upon with considerable minuteness. Of the remainder, one-third is devoted to heat, and two-thirds to electricity and magnetism, with a chapter on "Physiological Electricity," or its application in the cure of disease; a rather novel subject for the pages of a handbook of chemistry, although sufficiently important to the physiologist and pathologist to merit a place in works on their several branches.

It is not in reference to this preliminary matter by Dr. Sanders that we feel called upon to make exception, especially as we have not had time to examine it critically; for assuming it to be carefully compiled, it must add to the value of the work to those students who have not studied those subjects separately; but we do feel it our duty to enter a protest against the remainder of the volume as a mere reprint from the stereotype plates of the first edition, with a few changes in foot notes, and a few pages on the manufacture of aluminium (taken from the Pharmaceutical Journal)

in the Inorganic portion ; whilst a supplement embracing the more bulky additions to the fourth English edition of the Organic part, without any reference to them in the text, constitutes the revision of the Organic volume ! It was with surprise that we found the Editor, in view of the numerous additions and alterations made by Dr. Gregory, had lent his aid in sending out so imperfect a volume, calculated as it is to give a wrong impression of the valuable treatise of which it professes to be a reproduction, whilst in reality its text is nine years old. It is but a small matter that the leading additions are to be found in the supplement—they there stand disconnected from the text, which often contradicts them, and no marginal notes refer the reader to the discoveries and modifications of theory which may be there found. On carefully comparing the "Hand-book of Organic Chemistry" with the fourth English edition, page for page, we find so many omissions from the former that it will be impossible in the space at command to enumerate them. The more prominent, such as the view of homologous series of organic compounds, the account of the series of artificial organic bases, methyl and ethyl radicals and their amide bases and compounds with the metals of which methylamin and bismethyl are types, chloroform, the new benzole compounds, and several others, are contained in the appendix, without any notes to point the student to what part of the text they belong ; whilst a large number of important paragraphs throwing new light on subjects or modifying old opinions, are not noticed in any way by the Editor. Of such we may instance the anhydrides of the organic acids ; Dr. Playfair's nitroprussides ; Pasteur's observations in reference to the action of heat on the cinchona alkalies and on tartaric acid ; the relation of asparagin to malic acid as malamide, and the relations of these to succinic acid ; the later views relative to tannic acid ; Gerhardt's views of the action of heat on kinic acid ; new observations on the carbo-hydrogen essential oils and especially on oil of turpentine ; on the oxygenated essential oils and on the sulphuretted oils ; the recent results of Anderson and Greville Williams on the artificial organic bases ; the new methylic and ethylic compounds of nicotia and conia of Kerule and Planta ; the very important and interesting discoveries relative to the cinchona alkalies, including quinidia, cinchonidia, Pasteur's derivative alkaloids, quinicin and cinchonin, Herapath's iodoquinia, and the methyl and ethyl compounds of these bases, which are artificial alkaloids analogous to ammonia ; the analagous bases from morphia and codeia ; and various new facts relative to the saccharine bodies. Our space will not allow of a further enumeration of these omissions, but the above will give some idea of the shortcomings of the Editor in reference to the new matter of the fourth edition. It is a cause of deep regret that the best work on organic chemistry in the English language should in this manner be deprived of much of its value to the American student, merely to subserve the interest of the publisher in

the use of the stereotype plates of the old edition; and it is equally a source of regret that so valuable a treatise should not have fallen into hands better fitted to the task, who would have refused to edit the work under such unfavorable auspices.

We give below an extract from Dr. Gregory's Hand-book (page 413, English edition) which embraces much not noticed in Dr. Sander's edition, interesting to the pharmaceutical reader, viz:

b. Bases of Cinchona Bark.

a. Quinine. $C_{20}H_{12}N_2O_2$, or $C_{40}H_{24}N_2O_4 + n \text{ aq.}$ *SYN. Chinine.* This important alkaloid is found along with cinchonine, in most species of cinchona bark. It predominates in yellow bark, *Cinchona flava*, *China regia*, or *C. calisaya*; and is obtained by boiling with an excess of milk of lime the decoction in diluted hydrochloric acid of the bark, and treating the precipitate with hot alcohol, which dissolves cinchonine and quinine. On evaporation, the cinchonine is deposited in crystals and the quinine remains dissolved. Water is added, which causes the quinine to separate as a resinous mass. It may be obtained in crystals as a hydrate with 6 aq. There is another crystalline hydrate with 2 aq., by the spontaneous evaporation of its solution in absolute alcohol. It is very sparingly soluble in water, but very soluble in alcohol and in acids. Its solutions are very bitter. When heated with hydrate of potash, it yields carbonate of potash, hydrogen gas, and *quinoline* or *leucoline* (see p. 440 *et seq.*)

Quinine is decidedly alkaline, and neutralises the acids. Its salts, especially the sulphate, are very much used in medicine, especially as febrifuge and tonic remedies, in most cases very superior to the bark in substance. The sulphate of quinine used in medicine is $2(C_{40}H_{24}N_2O_4)$, $2S O_3$, $2H O + 14 \text{ aq.}$ The acid sulphate, $C_{40}H_{24}N_2O_4$, $2S O_3$, $2H O + 14 \text{ aq.}$, is much more soluble in water; hence, in draughts, sulphate of quinine is generally dissolved in diluted sulphuric acid. The hydrochlorate, phosphate, citrate, and ferrocyanate of quinine have also been employed in medicine.

$\left. \begin{matrix} \text{Methyloquinium, } C_{40}H_{24} \\ C_2H_3 \end{matrix} \right\} N_2O_4$. This compound, homologous with ammonium, is obtained as iodide, when iodide of methyle acts on quinine. From the iodide, by the usual means of oxide of silver, the hydrated oxide is obtained, which is probably a strong base, but has not been fully described.

$\left. \begin{matrix} \text{Ethyloquinium, } C_{40}H_{24} \\ C_4H_5 \end{matrix} \right\} N_2O_4$ is formed when iodide of ethyle acts on quinine. The hydrated oxide, prepared from the iodide by oxide of silver, is an energetic base, which attracts carbonic acid from the air. The preceding base is said to resemble it, which is no doubt true.

We may here mention the remarkable salt discovered by Mr. Herapath, which is formed when bisulphate of quinine is dissolved in strong acetic acid, warming the solution, and an alcoholic solution of iodine added drop by drop. The mixture being allowed to stand in a quiet place, deposits large hexagonal plates, which by reflected light are emerald green, with metallic lustre like the elytra of the golden beetle. By transmitted light, they have only a faint olive color. If two of these plates be superposed, so that their larger diameters are at right angles, no light passes through, even when the crystals are no thicker than the five-hundredth of an inch. This is exactly what happens with two tourmalines of which the axes are crossed. If polarised light be used, it passes through, giving to the uncovered part of each plate, complementary colors, such as green and rose-color, while the double or covered part appears of a deep chocolate brown. Hence these crystals may be used as polarisers and depolarisers, and they have the advantage of allowing far more light to pass through than tourmalines.

The composition of this salt is $C_{40}H_{24}N_2O_4, I_2, 2SO_3, 2H_2O + 10aq.$, and it may be considered as the bisulphate of *iodoquinine*, a base composed of quinine + 2 eqs. of iodine. Indeed such a compound is formed when iodine is triturated with quinine, as an amorphous brown mass, very similar to *iodocinchonine*.

b. Quinidine, $C_{40}H_{24}N_2O_4 + 4aq.$ This base, isomeric with quinine, is obtained from what is called in commerce *quinidine*, which is an amorphous basic substance, found in the mother liquors of quinine. This is a mixture of quinine and quinidine. The latter is much less soluble in ether than quinine, and crystallises when pure with great facility, in large rhombic prisms, which effloresce in the air. It differs from quinine also, in its action on polarised light, for quinine causes deviation to the left, quinidine to the right. The neutral sulphate of quinidine is like that of quinine, and may be used for the same purposes.

c. Quinicine, $C_{40}H_{24}N_2O_4$. This base, also isomeric with dry quinine, is formed when the salts of quinine or of quinidine are heated for some time to about $248^\circ F.$ It is bitter and febrifuge, insoluble in water, very soluble in alcohol, and causes deviation of the plane of polarisation to the right. It does not appear to crystallise.

d. Cinchonine, $C_{40}H_{24}N_2O_2$. This base predominates in the grey bark *Cinchona condaminea*, or *C. rubiginosa*, and is also found in large quantity, as well as quinine, in red bark, *C. oblongifolia*. Its preparation has been above described. It crystallises very readily, and is not so bitter as quinine, although highly febrifuge. When heated, a considerable part is sublimed. When distilled with potash, it yields quinoline. It neutralises the acids, forming crystallisable salts, which may be substituted for those of quinine.

It is very important to observe that cinchonine only differs from quinine by 2 eq. oxygen; and although hitherto no one has succeeded in converting one into the other, little doubt can be entertained that this will be accomplished in process of time. The fact that both yield quinoline is very interesting. Cinchonine yields with chlorine and bromine substitution-bases, *chlorocinchonine* and *bromocinchonine*, &c., in which 1 eq. of hydrogen is replaced by chlorine or bromine.

Quinine and Cinchonine may be distinguished in solution by adding first chlorine water, so as to make the liquid yellow, and then a little ammonia, which strikes a green color with quinine, but not with cinchonine. If too much ammonia have not been added, the green color changes to violet on the addition of a little more chlorine.

e. Cinchonidine, $C_{40}H_{24}N_2O_2$. This base, isomeric with cinchonine, occurs in a bark resembling the Huamalies cinchona bark, also in the Cinchona bark of Maracaibo, and in that called of Bogota. It is extracted by the same process. It forms hard, brilliant, rhomboidal prisms, striated on the faces. They are soluble in alcohol, very sparingly soluble in water or ether. Both this base and cinchonine cause the plane of polarisation to deviate to the right.

f. Cinchonine, $C_{40}H_{24}N_2O_2$. This base, isomeric with the two preceding, is formed by the action of heat on the sulphate of cinchonine. It is insoluble in water, soluble in alcohol and amorphous, bitter and febrifuge, causing deviation of the plane of polarisation to the right.

Bichlorocinchonine, $C_{40}H_{22}Cl_2 \} N_2O_2$. This base in which chlorine replaces 2 eqs. of hydrogen in cinchonine, is formed when chlorine is passed through a solution of the acid hydrochlorate of cinchonine. It is precipitated by ammonia, and crystallises from alcohol in minute prisms. It forms salts with acids.

Bromocinchonine, $C_{40}H_{23}Br \} N_2O_2$, is formed by the action of bromine on the acid hydrochlorate of cinchonine. It forms scaly crystals and produces salts with some acids.

Sesquibromocinchonine, $C_{40} H_{45} Br \frac{3}{2} N_2 O_2$, is formed along with the preceding base. It may be obtained in slender acicular crystals, and has a feeble bitter taste, but is alkaline. Its salts crystallise readily. The formula appears strange, but it is intended to show that the 24 eqs. of hydrogen in cinchonine are here made up in the proportion of $22\frac{1}{2}$ to $1\frac{1}{2}$ of hydrogen and bromine. $H_{45} = H_{22\frac{1}{2}}$ and $Br \frac{3}{2} = Br 1\frac{1}{2}$; the latter expressions, however, are never used, as being inconsistent with the very notion of atoms. It is not easy, however, to see how the fractions $\frac{45}{2}$ and $\frac{3}{2}$ are less inconsistent with that notion. The fact is, that equivalents are probably never single atoms, but groups, and such groups may be supposed to be divided, which atoms cannot be.

Bibromocinchonine, $C_{40} \left. \begin{smallmatrix} H_{22} \\ Br_2 \end{smallmatrix} \right\} N_2 O_2$ is formed like the two preceding, using an excess of bromine. It is separated by ammonia, and forms pearly needles, and sometimes octohedral crystals, the latter being a hydrate with 4 aq. It is also basic.

Iodocinchonine, $2 (C_{40} H_{24} N_2 O_2) + I_2$, is not a substitution-product like the preceding four bases, but is cinchonine *plus* iodine. It is formed when the two are triturated together. Alcohol dissolves the mass, and by spontaneous evaporation deposits, first, saffron-colored tubular crystals of iodocinchonine, and then hydriodate of cinchonine. The former is insoluble in barley-water, which dissolves the latter. It is slightly bitter, soluble in alcohol and ether.

Methylocinchonium, $C_{40} \left. \begin{smallmatrix} H_{24} \\ C_2 H_3 \end{smallmatrix} \right\} N_2 O_2$, is obtained as iodide when iodide of methyle acts on cinchonine. Treated with oxide of silver, this salt yields the hydrated oxide, which is a strong base, soluble in water, homologous with hydrated oxide of tetramethylum. Its salts are very soluble and do not readily crystallise.

Methylocinchonidium. This is the radical of another strong base isomeric with the preceding, and its iodide and hydrated oxide are obtained in the same way, from cinchonidine, and resemble those of methylocinchonium.

Quinine, cinchonine, quindine, cinchonidine, quinicine, and cinchonidine, all, when heated with potash, yield quinoline, a volatile oily base, already alluded to.

g. Aricine, $C_{46} H_{26} N_2 O_8$. This base was found in 1828, in a cinchona bark from Arica, in Peru, and has not since occurred. It is very similar to cinchonine, from which it differs in being soluble in ether. Aricine forms prismatic crystals larger than those of cinchonine. It is sparingly soluble in water, very soluble in alcohol, soluble in ether. It has a bitter taste. Nitric acid dissolves it with an intense green color, but decomposes it. Its salts are very soluble, and crystallise readily. The neutral sulphate, however, forms, when its hot solution is cooled, a gelatinous mass.

The mechanical execution of the volumes is creditable, and the general style of the "getting up" is good. The works may be had of H. Cowperthwait & Co. of this city.

Proceedings of the American Pharmaceutical Association, at the Fifth Annual Meeting, held in Baltimore, September, 1856; with a List of Members. Philadelphia. Pp. 91.

Since our last issue the Executive Committee of the Association have published the proceedings of the late meeting, and have, we presume, distributed the work to members by mail. As this work embraces a number of interesting papers, (several of which have been transferred to our pages)

and is double the usual size, we look upon it as an indication of a decided step in advance by the Association, and an earnest of what may be expected when a more general interest is taken in its success by pharmacutists in all parts of the Union. We do not know what arrangement the Executive Committee have made for the distribution of the work to those not members, since its publication has become such a heavy item in the expenditures of the Association, but would suggest to those who feel an interest in its progress, to mail half a dozen letter stamps to Edward Parriah, chairman of the Executive Committee, 8th and Arch streets, Philadelphia, with the request to have the pamphlet sent by post. In this way, at a very small inconvenience and expense, much aid can be extended.

Chemical and Pharmaceutical Manipulations; a Manual of the Mechanical and Chémico-Mechanical operations of the Laboratory, for the use of Chemists, Druggists, Manufacturers, Teachers and Students. Second and enlarged edition. By CAMPBELL MORFIT, Prof. of Analytic and Applied Chemistry in the University of Maryland, and CLARENCE MORFIT, of the U. S. Assay Office. With 537 illustrations. Philadelphia: Lindsay & Blakiston, 1857. Pp. 629, octavo.

It is with satisfaction that we have glanced over Prof. Morfit's new edition, and compared it with the previous one of 1849. We have been in the habit of recommending this work, as calculated to be really useful to pharmacutists who aim at qualifying themselves in the details of chemical manipulation. It is clearly written, well illustrated with drawings, and practical in its character. This edition is much enlarged, and bears the impress of a careful revision. In point of mechanical execution the volume is highly creditable to the publishers, both as regards the paper, press work and binding. We would offer some extracts from the new matter, had we not already at page 17 given space to a notice of the same work by a contributor, to which our readers are referred.

Transactions of the New Hampshire Medical Society, (sixty-sixth Anniversary, held at Concord, June 3rd and 4th, 1856. Concord, N. H., 1856. Pp. 76.

This pamphlet embraces several papers, among which are reports on Quackery, and on the indigenous Botany and Materia Medica, by Albert Smith, M. D., of Petersborough, N. H. We may have occasion to again refer to these, but at present our space is exhausted.

CATALOGUE OF THE CLASS OF THE PHILADELPHIA COLLEGE OF PHARMACY,
FOR THE THIRTY-SIXTH SESSION, 1856—7.

With a List of their Preceptors and Localities.

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Wetherill, J. B.	Philadelphia,	"	Thomas P. James,
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